

october
1956

MACHINE AND TOOL

blue book

IN THIS ISSUE:

Start and End
Trimming of
Progressive Dies

How to Design
Locking Gears

New Applications
in Ceramics
Tipped Tools



Rockwell Mfg.
Company's
Rockwell:
... give them
all the
information."



hitchcock
publication



CONTENTS ON PAGES 5 AND 6

what's going on at **MARVEL?**

1. A NEW BUILDING PROGRAM...



Not long after you read this, we will have completed the MARVEL plant expansion program which will *double* our already considerable manufacturing space. MARVEL'S confidence in the future and its continuing development, coupled with the increasing demand for MARVEL Hack Saws, Band Saws and Hack Saw Blades, makes this expansion mandatory.

2. A NEW "SUPER" BAND SAW



In our enlarged plant, we will demonstrate for the first time, a completely new, heavy duty, all-hydraulic, fully universal MARVEL Band Saw designed especially for High Speed Steel Band Saw Blades. This new "Super" Band Saw is heavier, more powerful and rugged than any band saw yet available. It incorporates a great many new and exclusive design and operating features to make it the most advanced Band Saw for BOTH high production and universal work.

3. AN INVITATION TO "TRY" BEFORE YOU BUY



One or more of the new Band Saws will be set up in our new plant, together with new, improved MARVEL Hack Saws, to demonstrate comparative performance on a wide variety of work. We will also set up specific cutting-off jobs requested by customers or prospective purchasers on *both* types of machines and arrange to have interested personnel observe and check the demonstration of comparative saw performance on *their own work*.

What better way is there to prove to yourself the speed, accuracy, efficiency and economy of MARVEL Saws and to select the right type of saw (hack saw or band saw) to best fit your individual job requirements?

FG-1700

ARMSTRONG-BLUM MFG. CO.
5700 Bloomingdale Avenue • Chicago 39, Illinois



Bellows-Locke

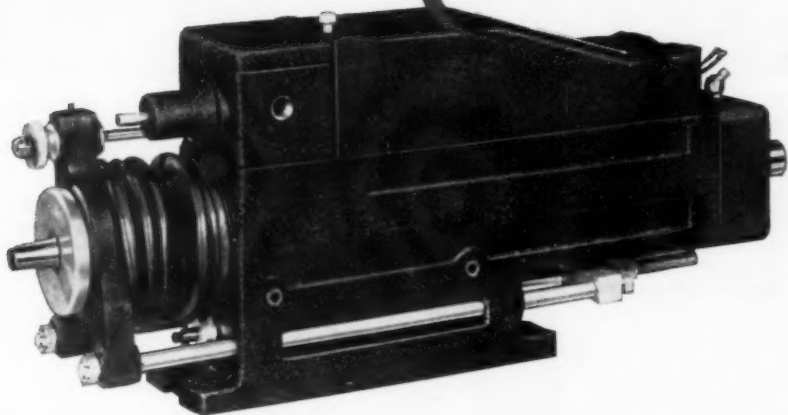
DRILL UNIT

Combines

HYDRAULIC FEED

**AIR POWERED
RAPID ADVANCE**

**ELECTRICALLY DRIVEN
SPINDLE**



Full 3" stroke — any part usable. Takes up to 5/16" drills. Either pulley driven or direct motor drive models available. Compact, stream-

lined, lightweight. Can be mounted at any angle in any plane. Any number of units can be easily synchronized and interlocked for accurately timed sequence operation.

WRITE TODAY FOR BULLETIN BL-5

**ADDRESS
DEPT. MTB-1056**

919A

The Bellows Co.

AKRON 9, OHIO

In Canada:

Pneumatic Devices of Canada, Ltd., Toronto, Ontario

think what you can do with
Unlimited Reversing...

found only on the

Wade ® HAND TURRET **LATHE**

This *exclusive* Wade feature offers you amazing flexibility of operation, resulting in production possibilities obtainable from no other comparable lathe!

A Standard Single Speed Motor is all that is required to drive. Instantaneous Reverse and Hi-Lo are provided through gears and Infinite Speed Changes through variable pitch pulleys.

Speed ranges are from 100 to 3500 RPM, with a high-low ratio of 5-to-1 (also exclusive with WADE). Reverse ratio $2\frac{1}{2}$ times the slow speed.

Be sure to write for literature, so you can learn about the many other features which make this fine hand turret lathe **one of the most valuable production tools you can have in your plant.**



THE WADE TOOL CO.

WALTHAM 54, MASS. U.S.A.

MAKERS OF PRECISION
MACHINE TOOLS FOR
AMERICAN INDUSTRY

Circle No. 202 on Card, Opposite Page 65

Hammond
WET
 OR **DRY**
CARBIDE TOOL GRINDERS



**MODEL
 14-WD
 WET OR DRY
 14" CARBIDE
 TOOL GRINDER**

Electrolytic — 6", 10" and 14" Wet or Dry Carbide Tool, Chip Breaker and Diamond Finishing Grinders available. A model for every application.

AMERICA'S MOST COMPLETE LINE

WRITE FOR CATALOG

Hammond Machinery Builders
 INC.

1614 DOUGLAS AVENUE • KALAMAZOO, MICHIGAN

(See us at Booth No. 1250 Metal Show, Cleveland—October 8-12).

Circle No. 203 on Card, Opposite Page 65

ARMSTRONG



Quality
TOOLS



*Not a cost, but an investment
that pays year after year*

Buy ARMSTRONG TOOL HOLDERS and TOOLS for today's job and they will bring you added profits thru the years. With ARMSTRONG TOOL HOLDERS you will be permanently tooling up for whatever comes, for each is a multi-purpose tool that takes cutter-bits ground to many shapes. Each is an efficient tool, refined thru a half century of world wide use. Each has strength beyond any need, extra strength resulting from endless research and the most modern closely controlled manufacturing methods.

ARMSTRONG TOOL HOLDERS are inexpensive, for they are produced in great numbers. They are instantly available because they are carried in stock by all leading supply houses in sizes and types for every operation on lathes, planers, slotters and shapers; for standard operations on turret lathes and screw machines. They are profitable in use because they permit the highest speeds and heaviest feeds, and "Save: All Forging, 70% Grinding and 90% High Speed Steel."

ARMSTRONG Lathe and Milling Machine Dogs are permanent tools too. They are drop-forged from special open hearth steel, are heat treated to extreme stiffness and toughness. They have alloy steel screws hardened at the tip to prevent up-setting and have double life, for hubs are made oversize to permit re-tapping.

ARMSTRONG Quality pays over and over again. It offers many opportunities to conserve profits.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5208 W. ARMSTRONG AVENUE • CHICAGO 30, ILL.

Circle No. 204 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

READER'S GUIDE

MACHINE AND TOOL

blue book

OCTOBER, 1956

VOL. 51 - No. 10

FEATURES THIS MONTH	87
AS THE EDITOR SEES IT	91
ROUNDUP OF WASHINGTON NEWS	93
LETTERS TO THE EDITOR	104

Interview

What is a Good Communications Program? An interview with Willard F. Rockwell	99
--	----

Diemaking

Start and End Trimming on Progressive Dies BY ERNEST J. URBAS	109
--	-----

Cam Design

Designing Locking Cams BY ALEX S. ARNOTT	117
---	-----

Ceramic Tools

New Applications in Ceramic Tipped Tools	126
--	-----

Labor

Right or Wrong in Labor Relations	129
-----------------------------------	-----

Soldering

Soldering in a Controlled Atmosphere BY A. C. STARRENBURG	136
--	-----

Grinding

High Speed Belt Grinding of Teflon	140
------------------------------------	-----

Quality Control

Production Quality Control Charts BY STERLING F. WINCHELL	152
--	-----

Automation

Automatic Machining of Jet Nozzle Bits	156
--	-----



Accepted as Controlled Circulation Publication at Pontiac, Illinois
Copyrighted, 1956, by the Hitchcock Publishing Company,
222 E. Willow Avenue Wheaton, Ill.

**SEE
NEXT
PAGE**

Reader's Guide

continued

Shop Hints

Special Locating Pin Deburrs Work	145
Aluminum Turning Tool	146
Salvage Worn Out and Broken Drill Ends	148

Departments

Meetings, Conventions, Exhibits	88
Right or Wrong in Labor Relations	129
Free Literature	161
News of the Industry	172
What's New in Metalworking	209
Mechanics Through the Ages	338
The Market Place	341
Products Index	343
Index to Advertisers	349

Editorial Staff

W. F. SCHLEICHER, vice-president and editorial director; P. A. MELINE, managing editor; D. M. CARLSON, assistant editor; E. McDANIEL, associate editor; W. W. BURTON, editorial assistant; L. C. LeCOMPT, reader's service; H. O. ERICKSON, Research Manager.

Editorial Advisory Board

M. JOHN AHLSTROMER, asst. factory manager, Chicago Screw Co.; RONNIE BURRITT, factory manager, J. J. Tourek Mfg. Co.; JOHN V. CARLSON, gen'l. supt., Union Special Machinery Co.; R. T. CARLSON, supt., NRK Mfg. & Eng. Co.; ROGER FARDIG, supt., B. F. Gump Co.; ED FLUSKEY, Consulting Eng., Revere Camera Co.; HOMER F. GRIFFITH, asst. works mgr. Ind. Power Div., International Harvester Co.; JOE KOSINSKI, works mgr., Scully-Jones & Co.; PAUL PRIKOS, vice pres., Prikos & Becker Tool Co.

Business Staff

R. C. VAN KAMPEN, president; VINCENT C. HOGREN, executive vice president; J. E. HITCHCOCK, HENRY J. SMITH, DAN E. REARDON, JAMES C. STEWART, vice-presidents; M. L. YONTS, secretary and production manager; OLIVER S. PEPPER, business mgr.; L. M. SCHROEDER, art director; R. L. SPRECKELS, circulation manager.
Hitchcock District Managers are Listed on Page 64.

MACHINE AND TOOL BLUE BOOK

Subscription rates: \$5.00 per year in U.S.A. \$6.00 per year elsewhere.

THE BEST MACHINE.... BUT COSTS THE LEAST

**CHECK ALL THREE . . . AND YOU'LL BUY
FULMER HONING MACHINES**

HONING MACHINE A	FULMER	HONING MACHINE B
19,675.00	15,290.00	36,330.00

Why buy a honing machine that costs more than a Fulmer Honing Machine? No other machine is more accurate . . . none will match the speed and ease of operation built into every Fulmer Machine.

The remarkable savings in the first cost of Fulmer Honing Machines are surprising. Figure, too, the interchangeability of parts; the convenient controls; Fulmer's speedy service and the profit-making savings because many internal honing operations take ONLY A FEW MINUTES instead of HOURS as with old-fashioned finishing methods.

Eleven models provide selection for any honing purpose. For cylinder blocks, connecting rods, blind end cylinders, hydraulic cylinders, valves, gears, etc.

Fulmer precision honing offers accuracy up to .0001" (\pm)



Write for Bulletin on Honing to: C. A. Fulmer Co.,
Dept. B 105 E. Fourth St., Cincinnati 2, Ohio.



FULMER honing equipment



CINCINNATI® FILMATIC 6'R x 18" Plain Hydraulic Grinding Machine equipped with Automatic Air-Electric Gage Sizing, with its exclusive Cycle Time Stabilizer. Complete information in two publications: G-660 and G-661. Write for your copies.



Size	Between-Center Lengths	Catalog
6"R } 10"L }	18" and 30"	G-660
10"R } 14"L }	18", 36", 48" 72" and 96"	G-661



CINCINNATI

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES

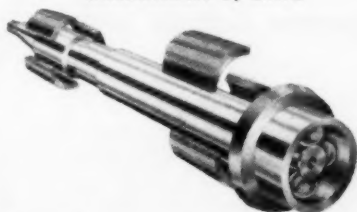
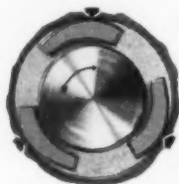
You'll get precision to the "NTH" DEGREE

...and consistently high production, too!

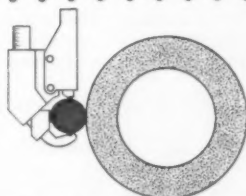
Speculation in precision and production has no place in today's metalworking shops. You can quickly end the guesswork where it hurts most . . . in your precision cylindrical work. Just install new CINCINNATI FILMATIC Plain Hydraulic Grinders in your shop and you'll have definite production that you can count on year after year, and within closer limits of accuracy than ever before. ¶ Four

Cincinnati features that help you attain these highly desirable results are illustrated below. These and many other features, translated into benefits for your shop, are outlined in two attractive catalogs: G-660 for the 6"R and 10"L machines; G-661 for the 10"R and 14"L machines. Write for copies.

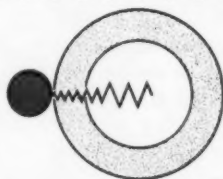
CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO



Grinding Wheel Balancing and FILMATIC Grinding Wheel Spindle Bearings are standard equipment. (FILMATIC principle illustrated at the left.) These two cost-reducing features alone are reason enough to choose Cincinnati.



Automatic air-electric gage sizing (extra) includes an exclusive Cincinnati advantage . . . cycle time stabilizer automatic compensation for wheel wear and truing.



Gap eliminator . . . greatly reduces time spent in "cutting air" during automatic infeed grinding operations. (extra)

CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

Circle No. 206 on Card, Opposite Page 65

The TREE 2UV MILL

gives you these
features—

- Roller Drive
- One Clamp Turret Lock
- Automatic Collet Closer
- Built-in Power Feed
- Rapid Traverse
- Labor Saving Operator Controls

*plus
Versatility*

The TREE 2UV Vertical Mill combines rigidity and flexibility to make it one of the most versatile on the market today. The following features make it adaptable to a wide range of jobs:

- Fully universal milling head with power feed
- Dovetail type ram—360° movable turret
- Table — 10½" x 42" — power feed and rapid traverse
- Hardened and ground lead screws by Ex-Cell-O
- Ample range: 25" longitudinal, 11" transverse, 17½" vertical travel
- Weight—2400 lbs.

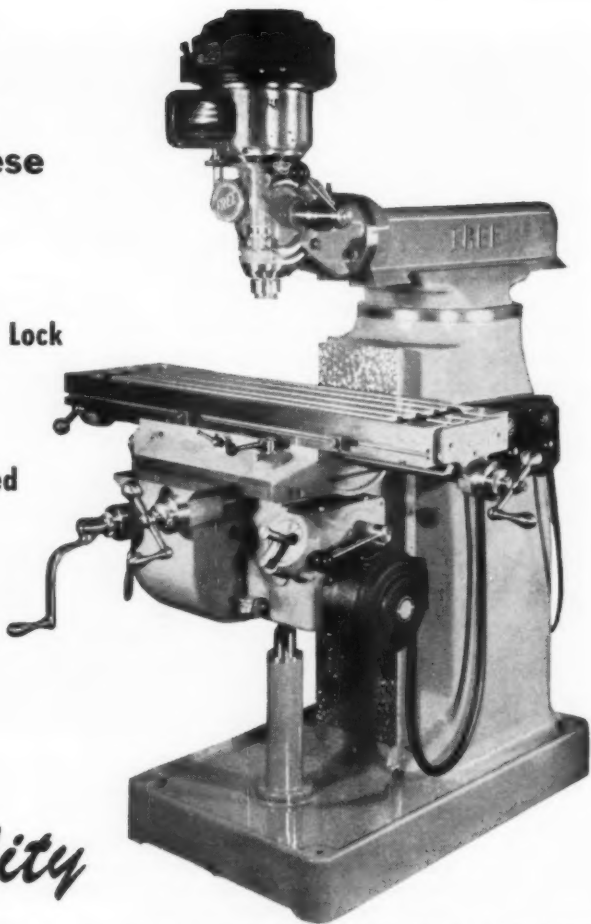
Write for complete information . . .

TREE TOOL AND DIE WORKS

1600 JUNCTION AVENUE

RACINE, WISCONSIN

Manufacturers of—MH-4 UNIVERSAL MILLING HEADS
TB-4 TAPER BORING TOOLS



SOSSNER

"the mark of quality since 1910"

ANNOUNCES

SOME **NEW** TAPS

WE ARE PROUD TO PRESENT THE LATEST
ADDITIONS TO OUR COMPLETE LINE OF
GROUND THREAD TAPS...

SPIRAL TAPS

THE MOST COMPLETE LINE...



REGULAR STYLE—#4 thru 5/16". This is the general purpose spiral fluted tap, primarily for use in blind holes in non-ferrous materials. It cuts reliably close to size.



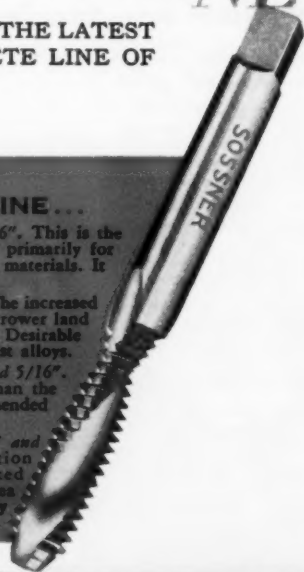
HOOK STYLE—#4 thru 5/16". The increased hook at the cutting face and a narrower land make this style more free cutting. Desirable for bar-stock aluminum and diecast alloys.



THREE FLUTE STYLE—1/4" and 5/16". This is a stronger construction than the two flute style and is recommended primarily for steel.



DOUBLE SCOOP STYLE—1/4" and 5/16". This unique construction combines a narrow land, hooked cutting face, maximum flute area and chip-breaker effect. Specially developed for deep blind holes.



"elektro LUBE" A PERMANENT SUPER-LUBRICANT

The elektro LUBE process imparts a thin ductile deposit which acts as a permanent super-lubricant which imbeds itself into the microscopic pores of the ground tap, resulting in a smooth burnished surface which becomes an integral part of the tap.

High pressures at A and B force out conventional lubricant. elektro LUBE takes over at these critical points and provides permanent super-lubrication.



SOSSNER TAP & TOOL CORPORATION
29 BROADWAY, LYNBROOK, L.I., N.Y.

Inquiries from representatives and distributors are invited.

BURGMASTER® AUTOMATIC HYDRAULIC TURRET DRILLS

with Power Indexing produce a "higher level of quality"

at **Bendix** Aviation Corp., Bendix Products Div., South Bend


They have this to say at Bendix, South Bend where 20 Burgmaster 6 spindle 2BH turret drills are effectively performing numerous secondary operations on aircraft parts —

"The work performed on the Burgmaster 2BH Models was previously run on 6 spindle hand-fed upright drill presses. The benefits derived over the old method of machining are:

- 1 With the drill fixture clamped in alignment under the spindle, a higher level of quality can be maintained and repair work has dropped to a minimum.
- 2 Operator works with less fatigue.
- 3 Uniform hydraulic feed enables us to produce better finishes and size."

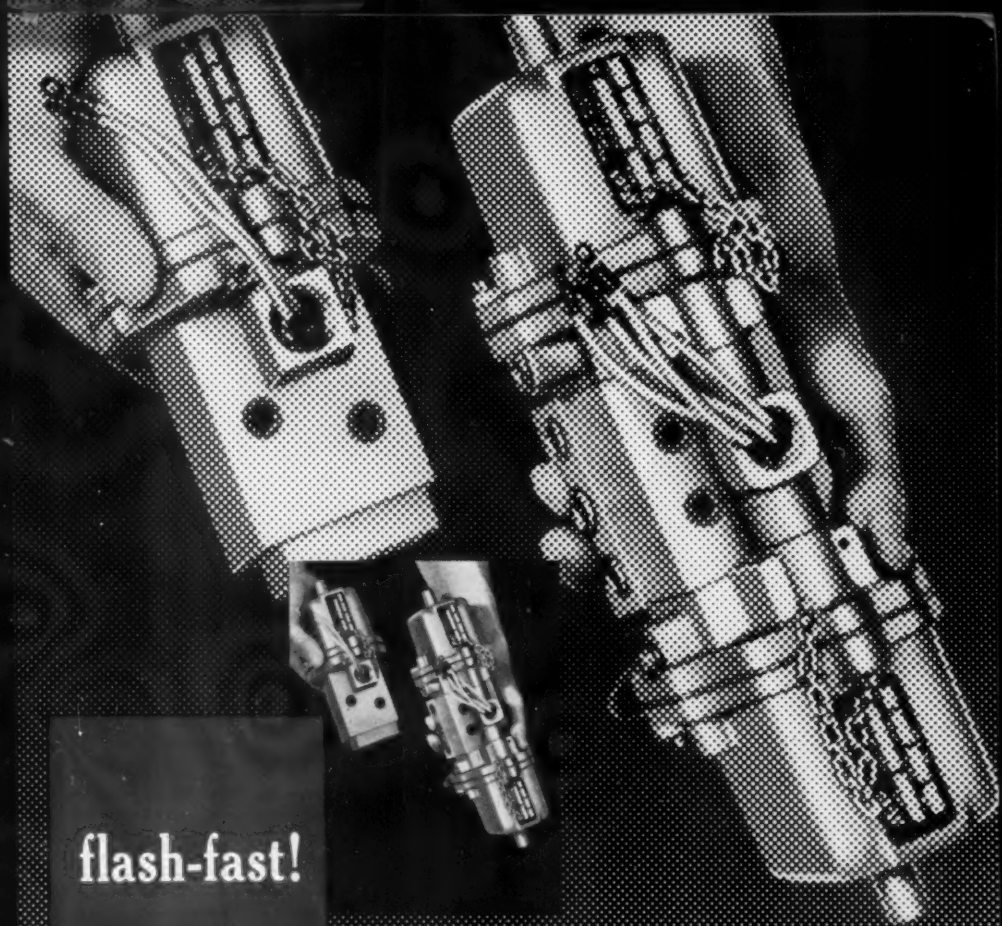
Machine tool users everywhere are experiencing these and additional benefits such as: simplified fixturing, extreme versatility—jobs formerly done on turret lathes, chuckers, hand screw machines can be done with ease on the Burgmaster; low initial cost, low maintenance, little floor space required. They are finding that here, in one highly versatile machine, drilling, reaming, counter-boring, countersinking, spotfacing, tapping, O.D. threading and many other operations can be accomplished with more accuracy — with one operator.

Automatic hydraulic Burgmaster (6 and 8 spindle models) feature skip indexing, automatic cycling and infinitely variable pre-selective feeds. All models (including the 6 spindle manuals) provide power indexing, pre-selective spindle speeds and very close pre-selective depth control.



B For complete information, address Dept. MT-10
BURG TOOL
Manufacturing Company, Inc.
15001 S. Figueroa St., Gardena, Calif.
Sales Offices:
New York • Chicago • San Francisco

Circle No. 209 on Card, Opposite Page 65



flash-fast!



In just .02 of a second the Ross Comet II completes a valving cycle—both energizing and de-energizing! This solenoid operated, balanced spool, 4-way is light and compact. Built to JIC standards, the $\frac{1}{4}$ " or $\frac{3}{8}$ " Comet II converts to scores of different uses!

Write for bulletin 314.

Ross

• • • EnginAirRed Circuitry • • •

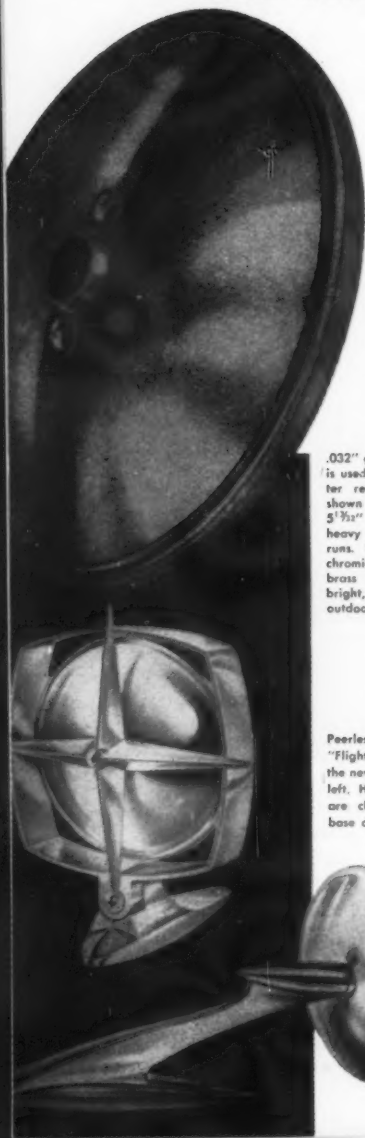
OPERATING VALVE COMPANY

108 E. GOLDEN GATE AVE. • DETROIT 3, MICHIGAN

Bob Rossi, Chief Engineer, tells
Roy Johnson, Plant Manager

"We switched to **Formbrite**

—and saved 12 cents apiece!"



.032" gage 70-30 Formbrite is used for this 4 1/2" diameter rearview mirror head shown full size. Strip is 5 1/2" wide supplied in heavy coils for long press runs. Copper, nickel and chromium plating on a solid brass base provides a bright, rustless, long-lasting outdoor finish.

Peerless Rearview Mirrors. "Flight-Wing," below, and the newer "Director" model, left. Housings and mounts are chromium-plated zinc-base die castings.

This easy-to-polish, superfine-grain drawing brass has been slashing finishing costs in plant after plant, on all kinds of jobs. Now Peerless Accessories Co., of Mount Holly, N. J., reports:

"To our line of lighting and safety automotive accessories, we've recently added two rearview mirror assemblies. We had been using regular drawing brass for the dished head until your representative persuaded us to try Formbrite. Here are the results, based on a very careful cost study:

Finishing procedure using regular drawing brass

- 1) Grease grinding or "cutting"
- 2) Buffing
- 3) Copper strike
- 4) Nickel plate (.00045")
- 5) Buffing nickel
- 6) Chromium plate

Cost 27¢ each

Present procedure using Formbrite®

- Not necessary with Formbrite
Light buff
Copper strike
Bright nickel plate (.0003")
Not necessary
Chromium plate

Cost 15¢ each

"That's a saving of 12 cents apiece. Multiply it by 3,000 to 4,000 a day and it becomes important money!"

*Formbrite's superfine grain made possible a lighter but equally serviceable plate of bright nickel

Surprisingly, Formbrite doesn't cost a penny more. Find out for yourself how its superfine grain, excellent drawing properties, strength, and scratch resistance can help you make a better product at lower cost. Write for Publication B-39. Better yet, ask us about a sample lot. The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

Formbrite FINE-GRAIN DRAWING BRASS

an **ANACONDA®** product
made by The American Brass Company

For your complete power CHUCKING REQUIREMENTS—specify **Logan**

Logan gives you
I MANUFACTURER
RESPONSIBILITY

Logan gives you
I ORDER
PURCHASING

Logan gives you
I SOURCE
MANUFACTURING

Write for FREE copy of "Circuit
Rider" booklet. It explains the
above circuit plus many others.

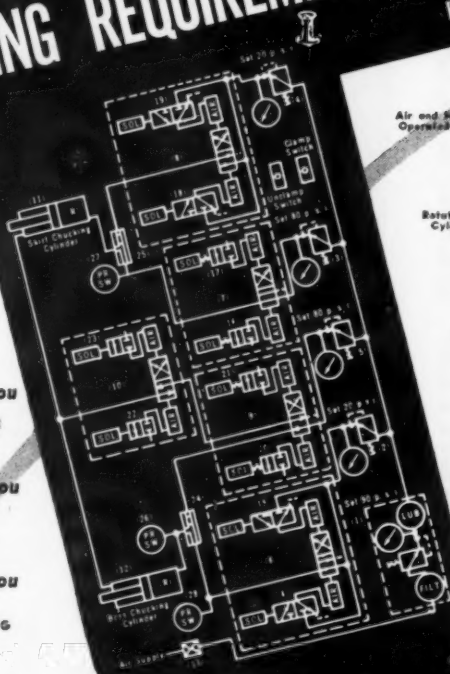


YOUR DEPENDABLE SINGLE SOURCE FOR
ALL AIR AND HYDRAULIC EQUIPMENT

MEMBER
Natl. Mach. Tool
Builders' Assn.,
Natl. Fluid Power
Assn.

Logan

PROPERLY DESIGNED — PROPERLY EQUIPPED



Air and Hydraulic
Operated Checks

Rotating Air
Cylinders

Air Valve

R.F.L. Unit

Electric-operated
Air Valves

LOGANSPOUT MACHINE CO., INC.
812 CENTER AVENUE, LOGANSPOUT, INDIANA

PLEASE SEND COPY OF CATALOG.

- | | |
|--|--|
| <input type="checkbox"/> 100-1 AIR CYLINDERS | <input type="checkbox"/> 62 SURE-FLOW PUMPS |
| <input type="checkbox"/> 100-2 MILL-TYPE AIR CYLS. | <input type="checkbox"/> 200-1 HYD. POWER UNITS |
| <input type="checkbox"/> 100-3 AIR-DRAULIC CYLS. | <input type="checkbox"/> 200-2 ROTOCASE HYD. CYLINDERS |
| <input type="checkbox"/> 100-4 AIR VALVES | <input type="checkbox"/> 200-3 750 SERIES HYD. CYLINDERS |
| <input type="checkbox"/> 100-5 LOGANSQUARE CYLINDERS | <input type="checkbox"/> 200-4 and 200-7 HYD. VALVES |
| <input type="checkbox"/> 100-5-1 ULTRAMATION CYLINDERS | <input type="checkbox"/> 200-4 SUPER-MATIC CYLS. |
| <input type="checkbox"/> 51 PRESSES | <input type="checkbox"/> 70-1 CHUCKS |
| <input type="checkbox"/> FACTS OF LIFE | <input type="checkbox"/> A&C BOOKLET |
| <input type="checkbox"/> CIRCUIT RIDER | |

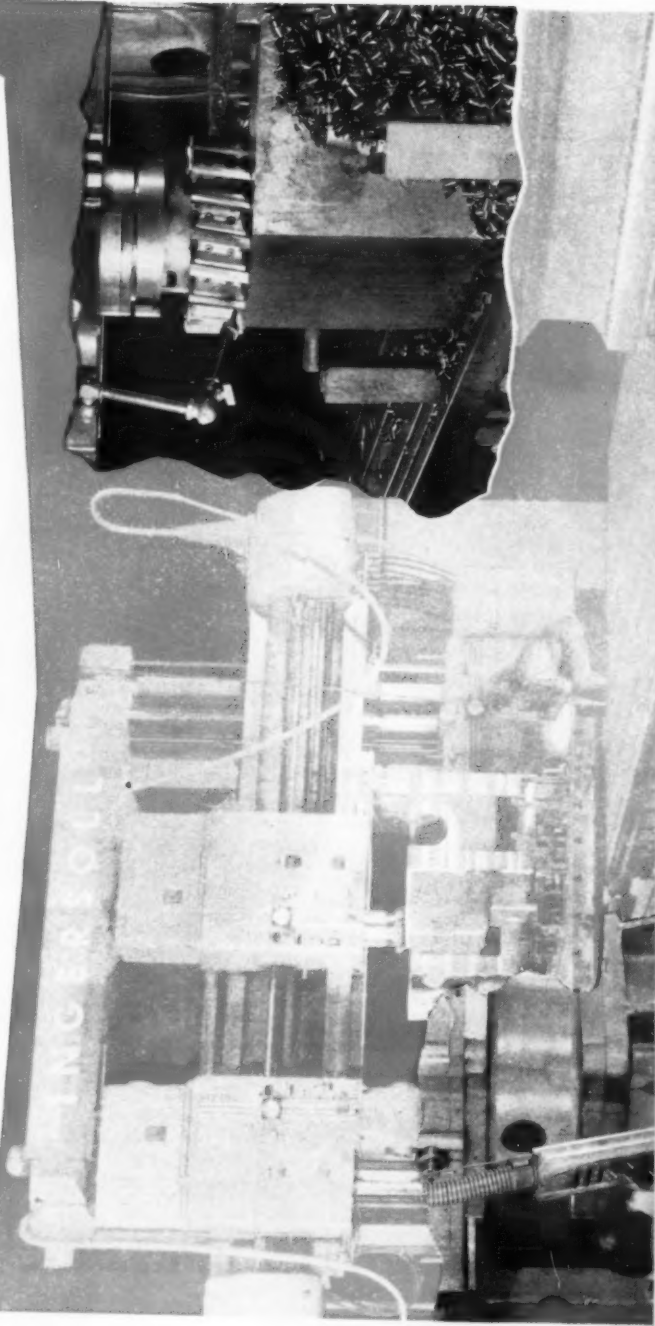
TO:

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

**\$2,500,000 'Metal Cutting Laboratory'
TESTS INGERSOLL INSERTED BLADE CUTTERS**





Eight large mills and 19 knee-type machines, costing \$2,500,000, are continually performance-testing Ingersoll cutters in regular production work at the Ingersoll plant, where we build some of the world's largest machine tools.

This ready-made metal-cutting laboratory is equipped with 600 different milling and boring cutters for work on cast iron, steel, aluminum, magnesium, copper, nickel and plastics.

As much as 400 h.p. is available in a single milling spindle for cutter research and development.

Write today for new Ingersoll Cutter Catalog 66E, describing Ingersoll inserted blade face mills, end mills, helical slab mills, side mills, arbor cutters and boring heads.



THE INGERSOLL MILLING MACHINE COMPANY

ROCKFORD, ILLINOIS, U. S. A.

BUILDERS OF SPECIAL DESIGN MILLING & BORING MACHINES
ORIGINATORS OF *SHEAR* *CLEAR* CUTTERS



Piasecki Helicopter

Sun's Heavy Duty Emulsifying Cutting Oil excels on high-alloy aircraft steels

S.E.C.O. Heavy Duty handles all machining jobs requiring an emulsifying cutting oil. Piasecki Helicopter's large job shop at Morton, Pa., found this out three years ago when S.E.C.O. HD* replaced two expensive heavy-duty soluble oils in machining fan hubs.

Extremely versatile and moderately priced, S.E.C.O. HD has been doing an exceptional job in cutting a variety of high-alloy aircraft steels for Piasecki.

For more information about S.E.C.O. HD, see your Sun representative. Or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MT-10

WRITE FOR

FREE TECHNICAL INFORMATION

- Cutting and Grinding Facts
- Disposal of Waste Emulsions
- New Improved S.E.C.O.
- S.E.C.O.—Mixing Instructions
- S.E.C.O. HD



INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

Philadelphia 3, Pa. © SUN OIL CO.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL



MORSE
EXECUTIVE
TEAM

MORSE
SALES
TEAM

MORSE
SALES
PROMOTION
TEAM

MORSE
ENGINEERING
TEAM

The MORSE



*Another
Reason
Why-*


MORSE



MORSE
EXPEDITING
TEAM



MORSE
PRODUCTION
TEAM



MORSE
PRODUCT
DEVELOPMENT
TEAM



MORSE
INVENTORY
CONTROL
TEAM

MORSE
MACHINE
DESIGN
TEAM



MORSE
TEAM OF
CARBIDE
TOOL
SPECIALISTS


TEAM

...all Specialists
...all Backing Up
your MORSE
FRANCHISED
DISTRIBUTOR

MORSE TWIST DRILL & MACHINE CO., NEW BEDFORD, MASS.

Subsidiary of VAN NORMAN INDUSTRIES, INC.

Warehouses in New York, Chicago, Detroit, Dallas, San Francisco



means "THE MOST"
in Cutting Tools

*Pru*tton

THREAD
ROLLING
MACHINERY

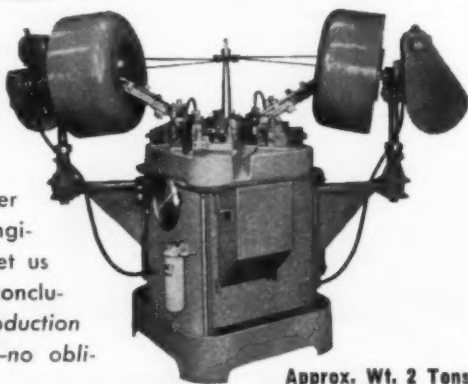
King Size or Midgets...



**THREADED NAILS
UP TO
50,000 PCS.
PER HOUR!**

Regardless of size or type of threading, users of Prutton Exclusive Planetary Dies and Thread Rolling Machines are setting unbelievable records in regular production of threaded nails.

The reasons will be obvious after you actually see this famous engineering combination in action! Let us demonstrate and prove this conclusively. Send samples of your production nails for our recommendations—no obligation, whatsoever.



Approx. Wt. 2 Tons


Prutton Corporation

5296 WEST 130th ST.


CLEVELAND 30, OHIO

Circle No. 216 on Card, Opposite Page 65

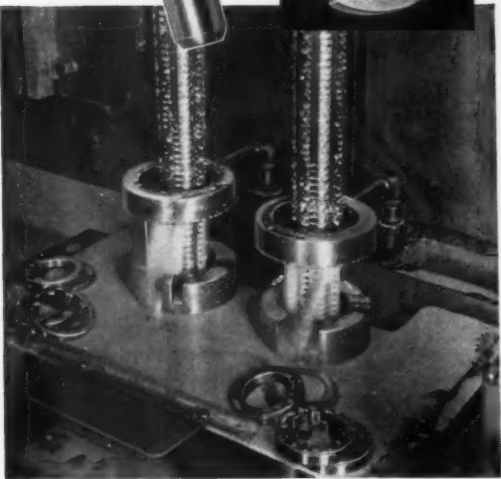
MACHINE and TOOL BLUE BOOK



More Production, More Profit BY BROACHING ...



**REMOVE STOCK TO
PRECISION LIMITS—FAST
...ROUGH AND FINISH
IN ONE PASS!**



The scope of Broaching has broadened in recent years. Many broaching operations do precision work in far less time than other metal-cutting methods.

Continental Engineers have for years been designing all types of cutting tools and broaches. They can recommend without bias your most economical way to do the work.

For facts about increasing your production by broaching, call in your local Ex-Cell-O representative—or write Continental in Detroit for Cutting Tool Catalog.

Internal broaching of a cam ring. Note the complexity of the ring design. The steel is soft and tends to tear, yet this Continental Broach sizes the I.D. and cuts 8 splines $5/16$ " deep in one pass.

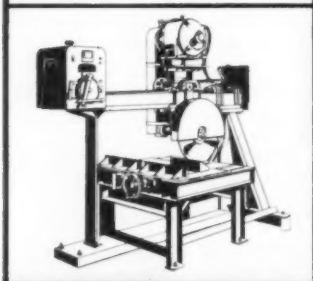
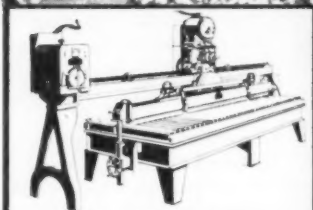
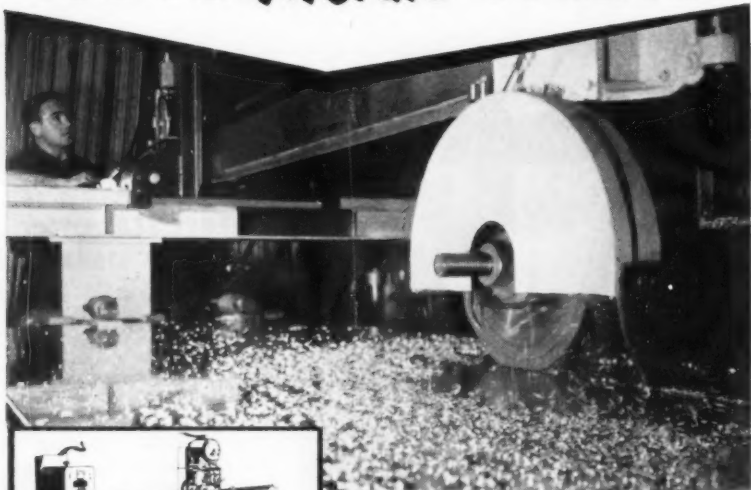
64-99
Continental



Circle No. 217 on Card, Opposite Page 65

WAREHOUSES • FABRICATORS • MANUFACTURERS

THIS LOW-INVESTMENT SAW CUTS *Metals* FAST!



Ty-Sa-Man

Long Cuts — Short Cuts — Cut Offs
Quick! Clean! Accurate! . . .

Here's high-speed production cutting with clean square edges to amazing tolerances. You can drastically reduce or eliminate machining edges and other finishing steps that waste your precious metal and time. Regardless of the type or size of metal you are cutting, there is a Ty-Sa-Man Saw to fit your needs. Cut-off saws for 10" to 48" cuts . . . long-cut saws for 4' to 60' cuts.

Write For Free Catalog
MACHINE COMPANY

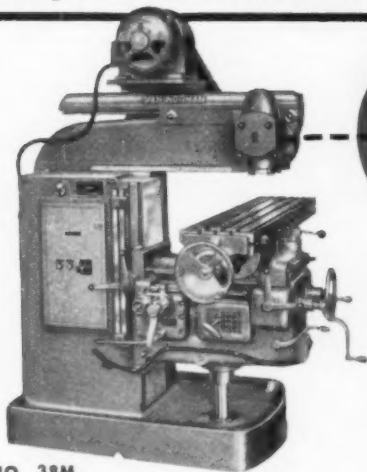
800 WHITE AVENUE, KNOXVILLE, TENNESSEE

Circle No. 218 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

VERSATILITY of VAN NORMAN Millers Saves Your Machine Dollars...

**One Van Norman Ram Type Miller
Gives You the WORKABILITY of TWO Single
Purpose Machines PLUS Angular Milling**

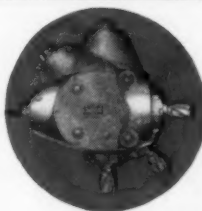


NO. 38M

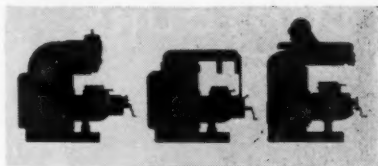
Table Size: 64" x 14"
Spindle Cutterhead motor: 10 HP
Ram Travel: 29" — Speeds: 12 — Feeds: 18

Regardless of the type of plant or type of work, a Van Norman Ram Type Miller can cut your milling costs and speed production. These versatile millers reduce idle machine time by as much as 50%.

But that's not all — with a Van Norman you save on capital expenditures, too! Here's how — with one Van Norman Ram Type Miller you can do horizontal, vertical as well as angular milling without attachments . . . all on one machine. This means less machine purchase dollars needed, more overall production from each miller because there is no waiting for single purpose machines.



Van Norman exclusive adjustable cutterhead permits horizontal, vertical or angular milling on one machine without attachments.



Vertical Milling Horizontal Milling Angular Milling

You do them all on one Van Norman Ram Type Miller

Find out how you can profit with a Van Norman Ram Type Miller. They are available in 14 basic models . . . a size to meet your particular requirements.

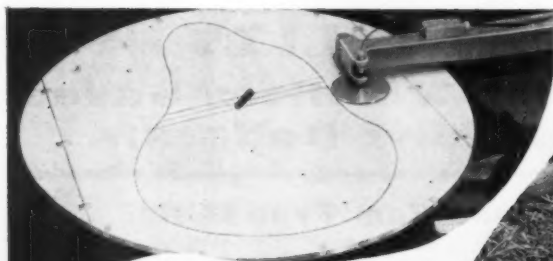
Write for full information, today.

Don't wait . . . for extra profits, install a Van Norman now! They are available on many purchase plans — Outright sale . . . Purchase on conditional sales contract up to 5 years . . . Pay as you depreciate. See your dealer or write Van Norman Company.

*Conditional Sales Contracts
not available to Export.*

VAN NORMAN MACHINE COMPANY SPRINGFIELD 7, MASSACHUSETTS

Manufacturers of — Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.



Non-contacting tracer follows the large-scale contour drawing easily prepared with electrically conductive "Ink." For this job, a 10:1 drawing-to-workpiece is used, but any desired scale such as 20:1 or higher can be selected.



Following the action of the tracer, the cutter reproduces the exact shape of the drawing on the workpiece. Due to the large reduction ratio, any errors in the drawing are reduced in the same proportion, resulting in accurate milling or grinding.

**mill or grind
IRREGULAR
CONTOURS**

without
**expensive models
or
complex
special tooling**



- mill or grind directly from simple line drawings • extremely accurate
- unique, non-contacting tracer control

MODEL 104 *Electronic* CAM and TEMPLATE MACHINE

IF YOU ARE PRODUCING . . . external or internal cams, templates, blanking punches or dies of complex, irregular shape —

WRITE TODAY FOR CIRCULAR NO. 579-1 . . . fully describing the Model 104 Cam and Template Machine. See how you can achieve greater accuracy, faster production and lower costs than ever before.

Manufactured by the
New England
Machine & Tool
Company. Sales engineering and maintenance
service through
Pratt & Whitney.



PRATT & WHITNEY COMPANY
INCORPORATED

22 Charter Oak Boulevard, West Hartford 1, Conn.
Direct Factory Representatives in Principal Cities
MACHINE TOOLS • GAGES • CUTTING TOOLS

Circle No. 220 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

NOW!

EMPIRE'S LUERS CUT-OFF BLADES...

Precision Ground on All Surfaces

These new Luers blades are held to precision tolerances on centrality and parallelism. Close tolerance grinding of all blade surfaces assures:

1. Accuracy of blade size and complete blade interchangeability.
2. Centrality of head to shank held to close tolerance.
3. Better blade cutting edges, longer blade-life, smoother cut-off surfaces



In addition you get all the established features of the Luers design, such as: hollow ground top which results in free chip action and cooler operation; constant side and angular clearances; resharpening on front face only.

Standard Luers blades are available from stock in 4 grades of high speed steel and in 4 grades of carbide tips. Solid cast alloy blades are also available on customer order.

Made under license issued by John Milton Luers

EMPIRE
8780 GRINNELL AVE. TOOL COMPANY DETROIT 13, MICHIGAN

Circle No. 221 on Card, Opposite Page 65

**MOTCH & MERRYWEATHER
CUT-OFF BLADES
and
SLITTING-SLOTING SAWS**

*Triple-
Chip*

STOCKING DEALERS in all principal cities.

FACTORY-APPROVED SERVICE in many industrial centers.

ENGINEERING SERVICE to solve your specific problem.

Challenge Motch & Merryweather to demonstrate that the Triple-Chip Method will cut off stock in faster time, with greater precision, and at lower cost than any other method. Rely upon Motch & Merryweather to engineer your job, recommend the right blade, and follow through. Our wide range of blades and saws is coupled with a wealth of technical experience and data on every phase of the circular sawing of all metals. Motch & Merryweather sales engineers in conjunction with dealers nation-wide stand ready to analyze your exact requirements and recommend a complete, profitable solution. Ample, strategically located stocks insure satisfactory delivery.

Also Kroslok Face Milling Cutters and Shell End Mills.
Also Triple C Grinding and Cutting Coolants and Machine Cleaner.



THE MOTCH & MERRYWEATHER MACHINERY CO.

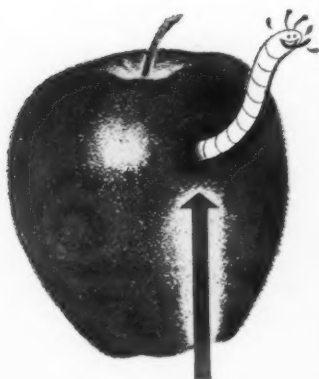
Cutting Tool Manufacturing Division

1250 EAST 222nd STREET, CLEVELAND 17, OHIO

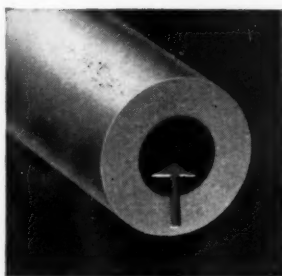
TRIPLE-CHIP CIRCULAR SEGMENTAL AND SOLID CUT-OFF BLADES • TRIPLE-CHIP SLITTING SAWS • KROSLOK FACE MILLING CUTTERS AND END MILLS • TRIPLE C GRINDING COOLANT • TRIPLE C MACHINE CLEANER • TRIPLE C CUTTING COOLANT

Circle No. 222 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK



a hole here makes waste...



a hole here saves waste

Crucible Hollow Tool Steels save waste—time and money—whenever you need ring-shaped parts or tools with a center hole. For the hole is in the piece when you get it! You eliminate drilling, boring, rough-facing operations — save machine capacity for productive work.

And you can get Crucible Hollow Tool Steels in *any* of our famous tool steel grades... in bar lengths or saw cut to your individual requirements. They are made in practically any combination of O.D. and I.D. sizes. What's more, delivery is *immediate* with Crucible's popular KETOS oil-hardening, SANDERSON water-hardening, AIRDI 15 high-carbon high-chromium, AIRKOOL air-hardening, and NU DIE V hot work tool steel grades from warehouse stocks.

Next time you have an application with a center hole, let your Crucible representative show you how these hollow tool steel bars can save you money and time. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

Circle No. 223 on Card, Opposite Page 65



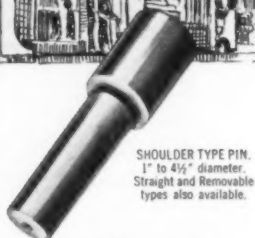
**"More than
TWENTY MILLION HITS
since we changed to Lamina
Guide Pins and Bushings!"**

"Since changing to Lamina Guide Pins and Bronze-plated Bushings on our dies, they have run more than 20,000,000 hits . . . and they're still going! Formerly, the best we could get was 4,000,000 to 5,000,000 hits on any make." *This is a typical quotation from an actual user letter.*

Lamina bronze-plated wring-fit bushings are pre-finished on the I.D. Seated on a shoulder square with the die shoe surface and secured by special retainers, they assure distortion-free, full bearing surface that results in better die alignment, less maintenance and longer die life.

Lamina Guide Pins are special tool steel, heat treated, spray quenched, hardened, ground and burnished. The uniform, hard surface resists wear, while the tough core won't bend in installation or use. These dimensionally accurate pins do not "mushroom" or get out of round, and require no "running in."

There is a size and type Lamina Guide Pin and Bushing for every need. Our new catalog shows illustrations, applications, dimensions and prices of more than 800 items. Ask your die set supplier, or write us for your free copy now.



SHOULDER TYPE PIN.
1" to 4½" diameter.
Straight and Removable
types also available.



LONG SHOULDER Bronze Plated Bushing
contains pin during entire stroke. ¼"
to 3" I.D.



NUT TYPE Bronze Plated Bushing for
wide range of requirements. 1" to 2" I.D.

SPECIAL PINS AND BRONZE-PLATED BUSHINGS for any application
... tailored to your requirements. Send prints for prompt quotation.

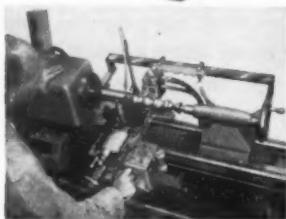
Lamina
DIES AND TOOLS, INC.
P.O. BOX 31, ROYAL OAK, MICHIGAN

NEW CLAUSING 12" LATHE with Hydraulic Tracer

Flame Hardened Ways • Variable Speed Drive



No. 6390
CLAUSING 12"
lathe with hy-
draulic tracer,
complete as
shown — ONLY
\$2350.00 F.O.B.
Factory



Contours and O.D. turning, as well as blended radii, steps, and tapers can now be precision duplicated automatically and rapidly, using inexpensive and easily made templates.



Precision duplicating of multiple diameters, tapers, bevels, shoulders, radii, grooves, chamfers

With this new CLAUSING you can . . . do automatic between-center reproduction of intricate patterns in a fraction of the time formerly required • eliminate repetitive measurements, multiple tool set-ups, expensive forming tools • impart a smooth, stepless finish • provide automatic sizing • reduce chance for human error • practically eliminate scrap.

FOR SHORT RUN AS WELL AS VOLUME PRODUCTION — short runs can be done economically because set-up and tool changes can be made in minutes. Savings on long runs are phenomenal.

HANDLES WORK up to 12" diameter, 2½" diameter differential, 18" length. Hydraulic cylinder housed in Servo motor provides power to firmly drive and hold cutting tool. Slide feed, in and out, infinitely variable from 0 to 15" per minute. All critical parts of tracer unit hardened, ground and machine lapped. Bed ways of lathe are flame hardened, ground. Variable speed drive from 43 to 222 and 250 to 1300 RPM, adjustable while running. Completely enclosed head stock, quick-change box, apron . . . oil bath lubrication. Spindle turns on big Timken "Zero Precision" tapered roller bearings.



WRITE FOR ILLUSTRATED LITERATURE

CLAUSING

**DIVISION
ATLAS PRESS COMPANY
10-107 N. PITCHER ST., KALAMAZOO, MICH.**

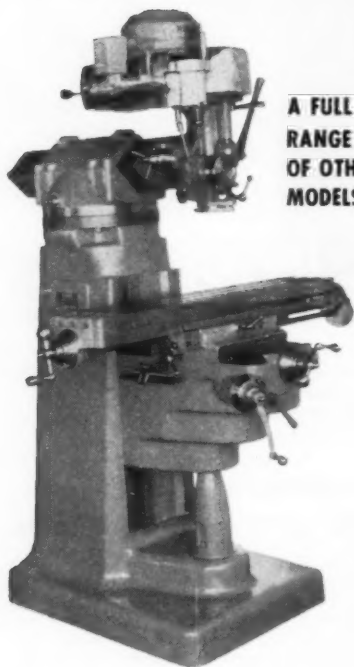
LIKE A
"45" AUTOMATIC

-this NEW
INDEX "45" MILL

has the "CALIBER" and "ACCURACY"
to do your

**MILLING, DRILLING-
and BORING JOBS**

**BETTER, FASTER AND
MORE ECONOMICALLY!**



**A FULL
RANGE
OF OTHER
MODELS.**

The big caliber derives from the sliding overarm—The unique square design of this overarm gives much more rigidity with its resultant greater accuracy—It provides extra range and capacity—More usable working space—More versatility in set-up—More power at the cutter. No adjustment required on overarm and head after use, and no need to re-indicate head after moving overarm. Speed range with 9 changes makes possible the use of high speed or carbide tipped cutters to the best advantage. Many other important features.

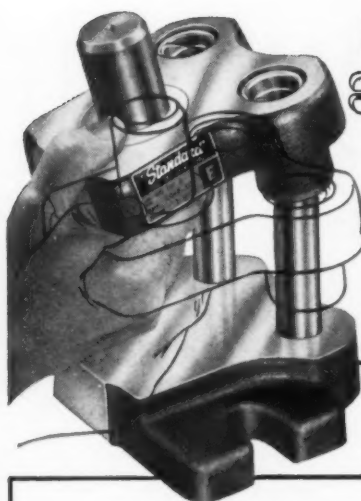
Write for literature.

INDEX MACHINE CO.

540 N. MECHANIC STREET

JACKSON, MICHIGAN

Circle No. 226 on Card, Opposite Page 65



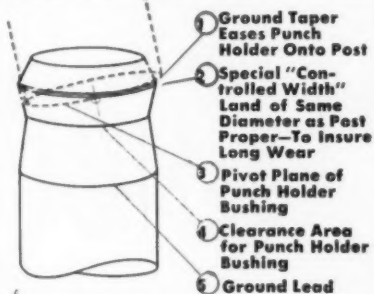
Stan the Die Set Man Says . . .

END DIE SET ASSEMBLY STRUGGLES

with the NEW McVEY-DESIGN®
"Standard" precision post

- No Hammering or Tapping
- No Jamming • No Binding
- No Costly Assembly Slow-Downs

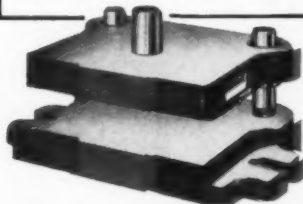
HOW THE McVEY® POST WORKS



This time-saving improvement, first applied to die sets several years ago by C. H. McVey, noted tool and die engineer, is now available for immediate delivery. The McVey design shown in the diagram is for 2 post die sets — design variations are available for 4 post sets.

Combined with Standard's constant-diameter, chrome-coated posts and full-bearing bushings, this design insures the ultimate in die set performance and assembly ease.

All these outstanding features are yours at prices competitive with ordinary die sets.



There's a difference in die sets and Standard makes the difference

BRANCHES:

New York • Philadelphia
Buffalo • Detroit • Grand Rapids
Indianapolis • Louisville

MAIL FORM TODAY FOR FREE DEMONSTRATION

Standard Die Set Manufacturers, Inc.
1489 Elmwood Avenue
Providence 7, Rhode Island

At no obligation, please have your engineer demonstrate the new McVey-Design Standard Precision Post.

Name

Title

Company

City State

Circle No. 227 on Card, Opposite Page 65

LIKE A
"45" AUTOMATIC

—this **NEW "45" MILL**

has the "CALIBER" and "ACCURACY"

to do your
**MILLING, DRILLING-
and BORING JOBS**
*... BETTER, FASTER AND
MORE ECONOMICALLY!*

The big caliber derives from the sliding overarm—The unique square design of this overarm gives much more rigidity with its resultant greater accuracy—It provides extra range and capacity—More usable working space—More versatility in set-up—More power at the cutter. No adjustment required on overarm and head after use, and no need to re-indicate head after moving overarm. Speed range with 9 changes makes possible the use of high speed or carbide tipped cutters to the best advantage. Many other important features.

Write for literature.

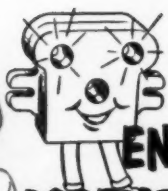
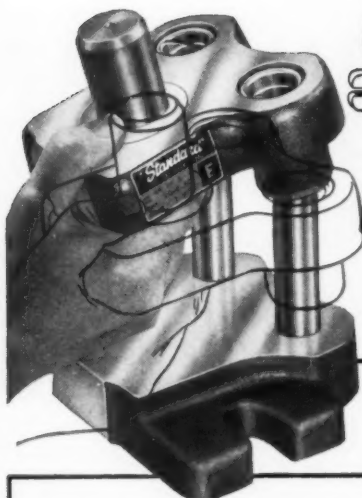
INDEX MACHINE CO.

540 N. MECHANIC STREET

JACKSON, MICHIGAN

Circle No. 226 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK



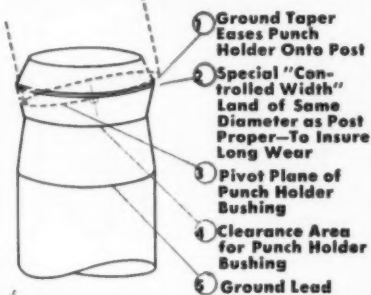
Stan the Die Set Man Says . . .

END DIE SET ASSEMBLY STRUGGLES

with the NEW McVEY-DESIGN®
"Standard" precision post

- No Hammering or Tapping
- No Jamming • No Binding
- No Costly Assembly Slow-Downs

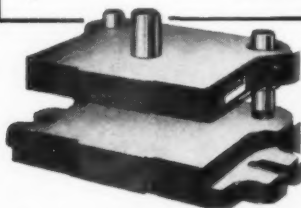
HOW THE McVEY® POST WORKS



This time-saving improvement, first applied to die sets several years ago by C. H. McVey, noted tool and die engineer, is now available for immediate delivery. The McVey design shown in the diagram is for 2 post die sets — design variations are available for 4 post sets.

Combined with Standard's constant-diameter, chrome-coated posts and full-bearing bushings, this design insures the ultimate in die set performance and assembly ease.

All these outstanding features are yours at prices competitive with ordinary die sets.



There's a difference in die sets and
Standard makes the difference

BRANCHES:

New York • Philadelphia
Buffalo • Detroit • Grand Rapids
Indianapolis • Louisville

MAIL FORM TODAY FOR FREE DEMONSTRATION

Standard Die Set Manufacturers, Inc.

1489 Elmwood Avenue

Providence 7, Rhode Island

At no obligation, please have your engineer demonstrate the
new McVey-Design Standard Precision Post.

Name

Title

Company

City State

Circle No. 227 on Card, Opposite Page 65

New Accuracy
New

New Quiet

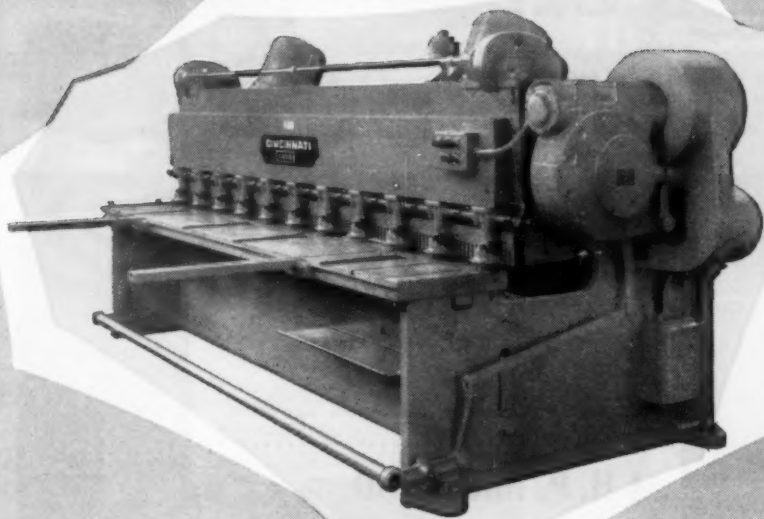


THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES

Cincinnati Shears



New design in Cincinnati Shears has brought a new quiet and accuracy in performance.

New low rake has increased accuracy—producing blanks to very close tolerances with straight clean edges.

The new design, powerful hydraulic holddowns operate quietly and assure full pressure for holding. Front control of the power back gauge saves time in operation and gives a positive, accurate, easy control of gauging from operator's working position.

Write for catalog S-7R.

in MILL HEADS

RUSNOK

*Builds the BEST Quality
at the BEST Price*

1/4 H.P. CONVERTICAL MILL HEAD

Only low cost mill head with quill travel attachment.

High speed medium-light operation.

For bench, floor and pedestal mills.

Fits milling machines with overarm 1 1/2" to 3".

3/8" end mill capacity.

\$245⁰⁰



RUSNOK

1/2 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT

Fits milling machines with 3" to 5" overarm.

3/4" end mill capacity.

For vertical, horizontal and angular operations.

.....

1 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT

Fits milling machines with 3" to 5" overarm.

3/4" end mill capacity.

For vertical, horizontal and angular operations.

RUSNOK

RUSNOK TOOL WORKS

4840 West North Ave., Chicago 39, Ill.

DEALERS IN ALL PRINCIPAL CITIES

MILLING • DRILLING • BORING

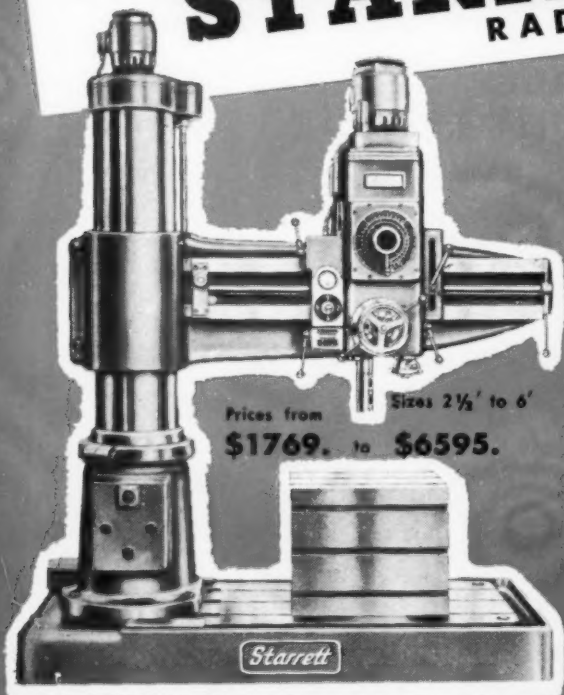
Circle No. 228 on Card, Opposite Page 65

**BEST VALUES
IN U.S.A.**

NEW FEATURES . . . HIGH QUALITY . . .

STARRETT

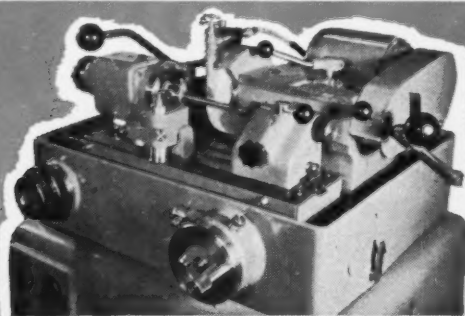
RADIAL DRILLS



Prices from
\$1769. to \$6595.

Sizes 2 1/2' to 6'

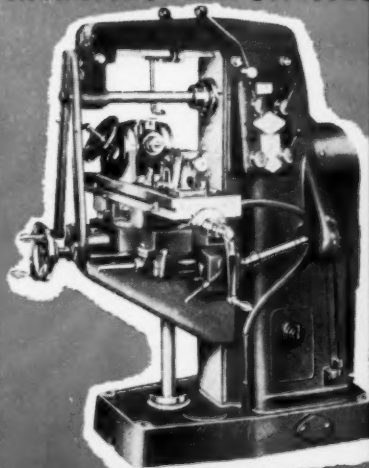
Starrett



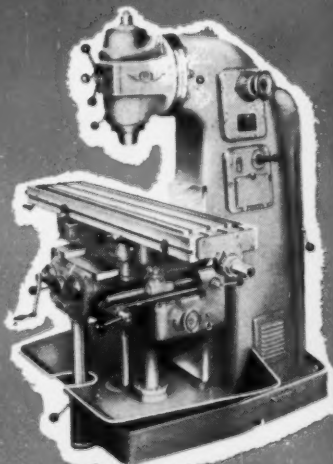
OVERBECK precision cylindrical grinders

Sizes 1 9/16" o.d. x 4 3/4"

PEDERSEN
Horizontal, Vertical, Combination
MILLING MACHINES



VPU-0 \$2,595.



VPV-2 \$6,490.

AARON MACHINERY CO. INC.

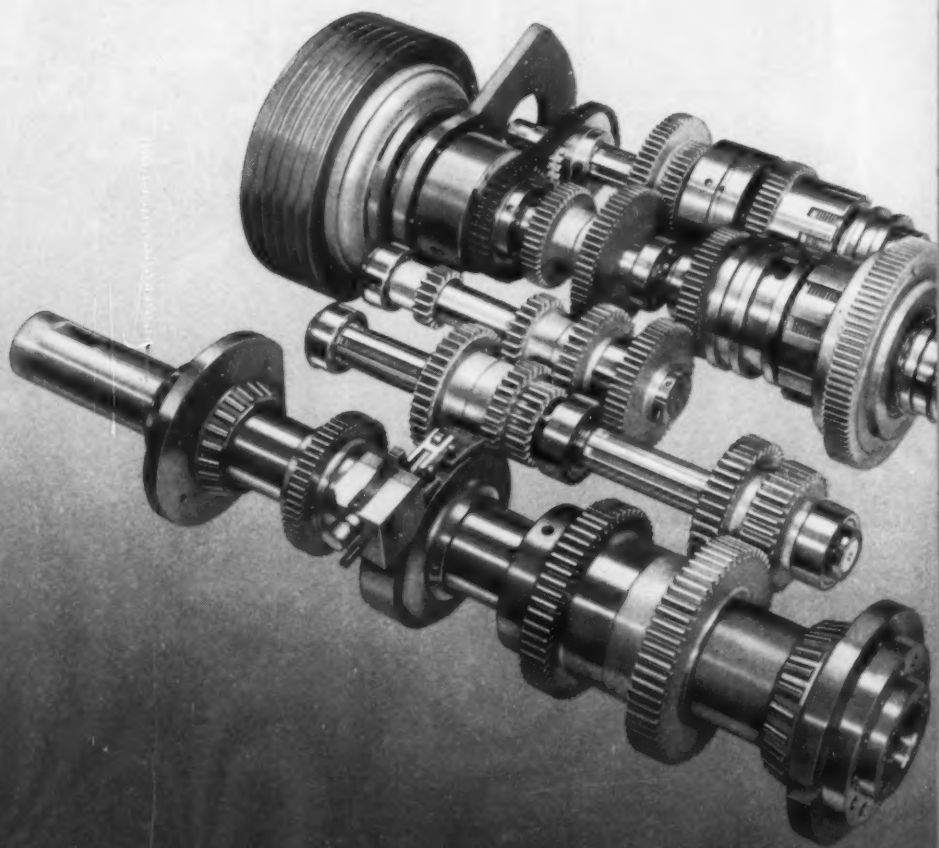
Dept. B • 45 Crosby St., N. Y. 12, N. Y. • WALKER 5-8300

Branches at: Buffalo N.Y. Mineola N.Y.

Liberal Terms • Rental Plans

See page 57

The power reserve and range of speeds
YOU'LL NEED FOR THE



WALES CD UNITS *increased our* HOLE PUNCHING PROFITS

● You can always save **TIME** and **MONEY** with **WALES CD Units**. **ELIMINATE** stripper plates, custom punches and dies.

CD Units are mounted in sets—outside the press. Change set-ups in 'jig time'. All parts are interchangeable. Maintenance costs are pared to the bone. Alignment is automatic and accurate.

Press down-time is practically non-existent. For multiple hole punching, nothing equals the speed and simplicity of **WALES CD** punch and die assemblies.



For punching round or shaped holes up to 2" dia. in $\frac{1}{8}$ " mild steel.

Other WALES units available for punching holes up to $3\frac{1}{2}$ " dia. in stock up to $\frac{3}{4}$ " thick.



Showing WALES CD Units in same set-up with WALES BL Hole Punching Units and WALES Type N Notching Units in punch press.

Send for Bulletin No. 16J

The CD story is factual and sure to suggest many ways to enable your hole punching shop to make more money. Sent free.



WALES *Strippit* COMPANY

"...the Wales-Way is the PLUS-PROFIT way"

345 PAYNE AVE. — North Tonawanda, N.Y.

WALES-STRIPPIT OF CANADA LTD., HAMILTON, ONT.

extra!

ALL ABOUT THE LATEST BENDING METHODS

Let Pedrick show you how the latest methods of bending pipe, tube and structural metal—on a job or production basis—can save you money.

For full information on Pedrick Production Benders, write PEDRICK TOOL AND MACHINE Co., 3640 N. Lawrence St., Phila. 40, Pa. Dept. 3.



FREE "PEDRICK LINE" BULLETIN.
WRITE TODAY.

See PEDRICK—Booth 2456 National
Metal Exposition Cleveland—Oct. 8-12

PEDRICK

production benders

Circle No. 234 on Card, Opposite Page 65

Doing the Hole Job-

Better, Faster, at Lower Cost

**BESLY
TAPS**

**with UNSURPASSED
ACCURACY
at all vital points**

● LET US PROVE that Besly can help you get better threaded parts, longer tap life and lower tapping costs. Ask your authorized Besly Distributor for a TRIAL RUN on your toughest jobs . . . PLUS details on Besly's Super-Service on "Specials".



**Tru-Square
DRIVER**



**Mirror-Finish
FLUTES**



**Solid-Ground
THREAD FORM**



**Accurate
RAKE ANGLE**



**Microcentric
CHAMFER**



BESLY-WELLES CORPORATION

Established as Charles H. Besly & Co. in 1875
122 Dearborn Avenue, South Beloit, Illinois



TAPS



DRILLS



REAMERS

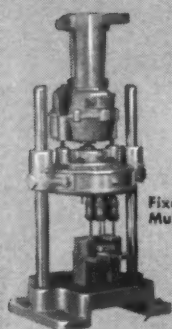


GAGES

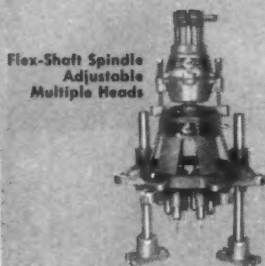


**CARBIDE
TIPPED
TOOLS**

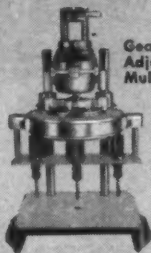
***Unit engineered for greater
small hole drilling
and tapping production!***



**Fixed Spindle
Multiple Heads**



**Flex-Shaft Spindle
Adjustable
Multiple Heads**



**Geared Spindle
Adjustable
Multiple Heads**

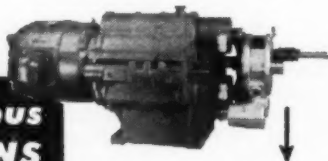
ETTCO-EMRICK MULTIPLE HEADS

BOTH the head and workholder are designed as a unit to your requirements to give you a complete high production system capable of maintaining highest production rates on your drill press. Thus, you are not only assured of drilling and tapping the maximum number of holes at each stroke but — what is just as important — the fastest handling of the parts.

SEE FOR YOURSELF. Send samples or drawings of your parts with basic production data. We'll give you recommendations and prices.

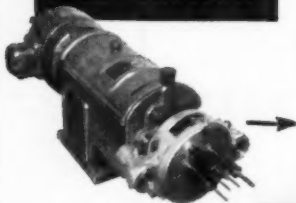
For details, ask for our Multiple Head Bulletins.

The famous T-D TWINS



Automatic Drilling Unit

Completely self-contained with exclusive features that mean better work at lower cost.



Automatic Lead Screw Tapping Unit

Used with Ettco-Emrick Multiple Heads, it's the ultimate in fast, automatic precision tapping.

"See your Authorized Ettco Distributor"

ETTCO TOOL CO., INC.

596 Johnson Ave., Brooklyn 37, N. Y.

Chicago • Detroit • Los Angeles • Indianapolis

Ettco-Emrick

the right equipment
for every small hole
drilling and tapping need.

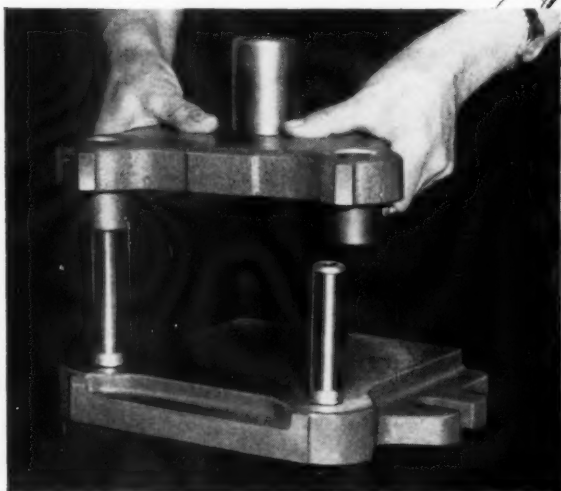
Circle No. 236 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

NEW

Easy Punch Holder Removal

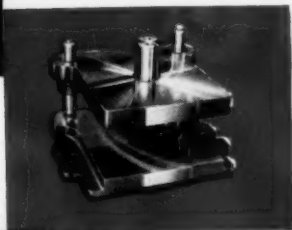
ON **NEW** DANLY DIE SETS



Danly's leadership in die set design is seen in another improvement . . . easier removal of punch holders. Standard Danly Die Sets are assembled with one post a half-inch longer than the length specified . . . thus, the punch holder swings free before binding can occur.



complete new "leadership line" catalog
More than 200 pages provide you with complete design information, easier selection of die sets and supplies.
Write for your copy today!



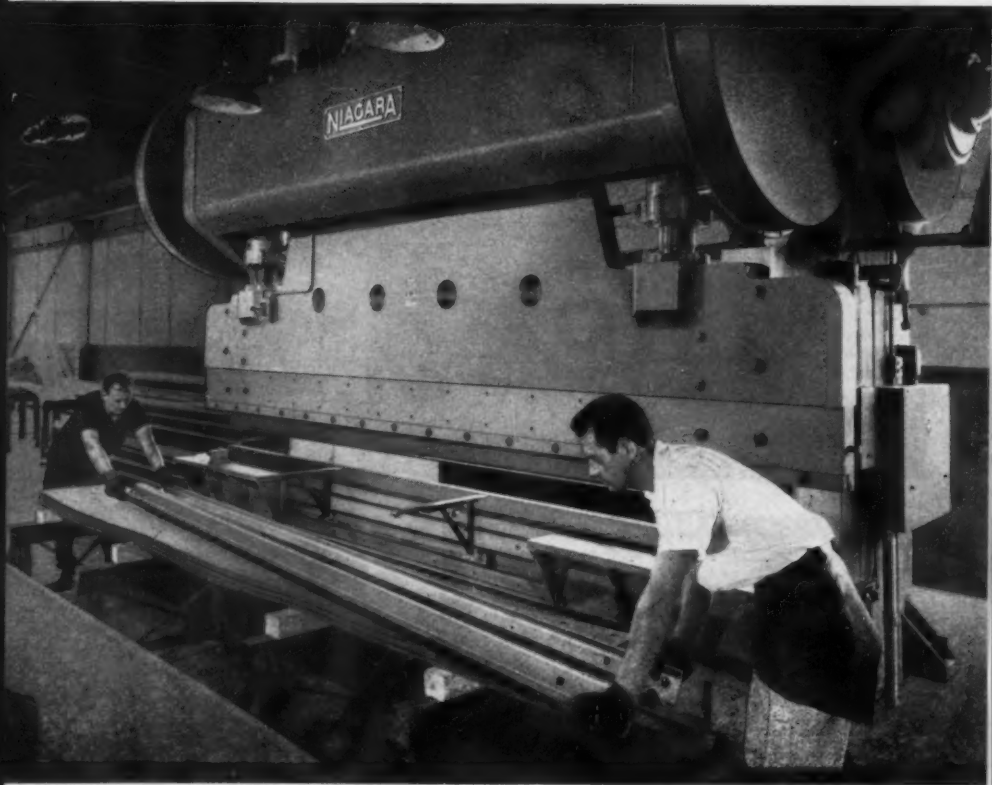
**DANLY MACHINE
SPECIALTIES, INC.**



2100 So. Laramie Ave.
Chicago 50, Illinois



"we go back to



(Above) Forming highway guard rails from 12 gage steel on Niagara 520 Ton Press Brake.

(Right) Piercing rails with same machine.

(Far Right) Forming chair seat frames for office furniture from 20 gage steel on Niagara 150 Ton Press Brake.

Niagara for Press Brakes"

"The personnel of our organization has been acquainted with Niagara equipment for years. Niagara will stand behind *any* equipment furnished. Many millions of operations in the past 5 years on their presses and press brakes...equipment satisfactory from both the operational and safety standpoint. Our intention is to use the Niagara line entirely."

There in the words of one customer (a large Ohio metal fabricator whose press brake operations are illustrated), you have the sentiments of hundreds. Once experienced with *any* of the other metalworking machines which Niagara makes...presses, shears, bending rolls and dozens more...one just naturally thinks first of Niagara whenever the subject of press brakes comes up.

REASONS ARE MANIFOLD: (1) Extreme helpfulness of Niagara's engineers in selecting the machine and accessories that will do the job best (no other manufacturer can offer so complete and large a line of sheet and plate metalworking equipment). (2) Unrivaled reputation and experience in the field, dating back 77 years, that assure unquestioned reliability. (3) World-wide recognition for design leadership, combining rock-bottom operating economy and top-notch performance in *every* product it makes (take a moment to run down this partial list of imposing press brake features):

- Double end twin drive with double reduction gearing for smooth, uniform application of power at both ends of ram.
- Rugged, all-steel frames with box type crowns of unequaled strength and rigidity.
- Extra heavy, rigid bed and ram for maximum support of dies.
- Gearing totally enclosed in sealed oil baths for thorough, clean lubrication.
- Longer lasting, laminated, nonmetallic ways.
- Powerful, smooth-acting, multiple disc clutch and brake.
- Gibs maintain accurate, endwise alignment of ram.

Standardized in a complete line, ranging from 50 through 775-ton capacities, Niagara Press Brakes are built to produce a tremendous variety of work uniformly and accurately. Post yourself now on all the details by requesting Bulletin 89 D and, as soon as you can, avail yourself of some really worthwhile suggestions from a Niagara representative. Write.



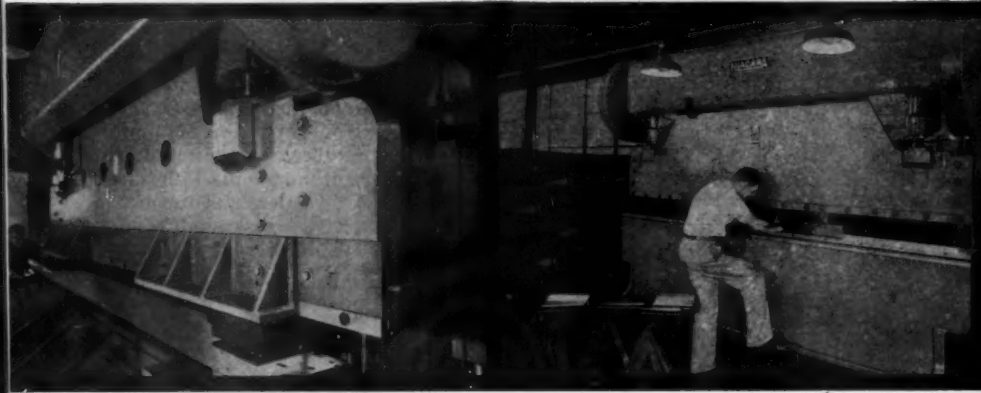
NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

DISTRICT OFFICES:

Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U.S. cities and major foreign countries

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work



NIAGARA PRESS BRAKES

NO. 1 *"Roughing it"* with
Reddy MacFlint

*"Tricky shot — smooth club
... what a finish! You know
AP Jewel Brand Belts are used
to finish the finest 'woods'
including brassies and drivers
that combine metal and wood."*



**"Smoothing
the way
where the going
is rough"**

Frequently AP salesmen
are able to provide unusual
service in supplying
abrasives because their plant is
neither too big to lose the
personal touch nor
too small to lack
emergency capacity.



Abrasive Products, Inc.

South Braintree 85, Mass.

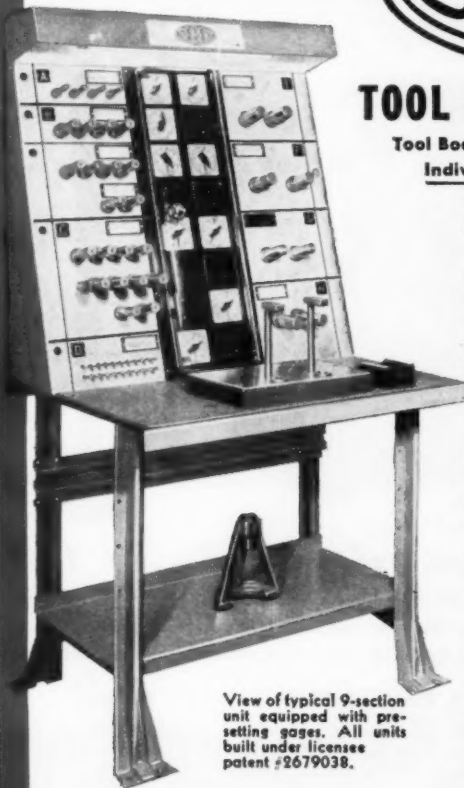
Circle No. 239 on Card, Opposite Page 65

Announcing New

SEIBERT

TOOL CONTROL SYSTEM

**Tool Board, Cyclometers, Pre-Setting Gages
Individually Designed to Suit Your Needs**



View of typical 9-section unit equipped with pre-setting gages. All units built under license patent #2679038.

PRODUCTION ADVANTAGES

- Reduces down-time, provides an efficient system of programming tool changes.
- Automatically controls machining operations; provides visual record of use life of each tool.
- Assures more efficient use of tools, reduces breakage and scrap losses.
- Provides storage and complete facilities for pre-setting tools at the machine.

Now, from Seibert, you can obtain tool control boards that are individually designed to suit your production requirements. Panels are subdivided into sections for each type of tool, and divisions are arranged as required with space for two sets of tools for each job. Tool panels and benches are available in 3, 6, 9 or 12-foot lengths. In addition, you can now obtain from Seibert pre-setting gages of all types and also optional equipment such as plastic cyclometer covers with locks, drawers, shelves, etc., to suit your specific needs.

INCREASES PRODUCTION EFFICIENCY

Tool Control Boards are a tested and proven method of increasing the efficiency of production machine tools. They provide a system of scheduling tool changes according to pre-determined efficiency standards. You cut down-time, insure longer tool life, reduce tool breakage, and lower scrap losses.

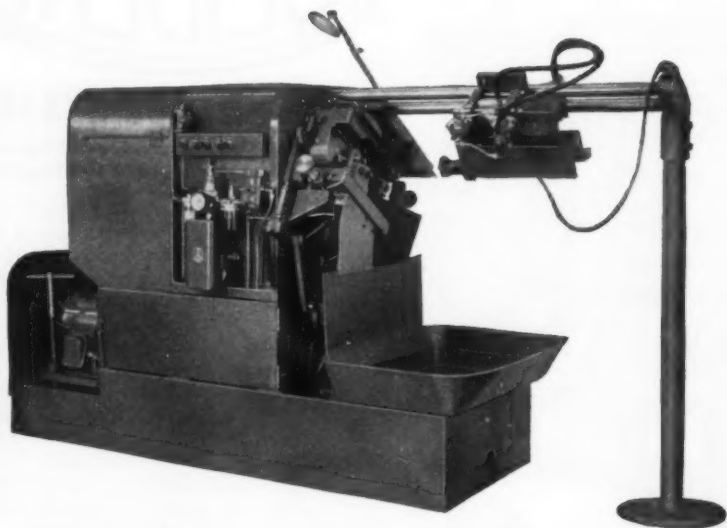
Write for Additional Data

Get the complete story on new Seibert Control System. Specify circular B-10, or ask a Seibert Sales Engineer to survey your requirements.



SEIBERT & SONS, INC. CHENOA, ILLINOIS
Quality MULTIPLE DRILL SPINDLES AND PRODUCTION TOOLS

The MODERN AUTOMATIC CUTTING-OFF MACHINE



Cuts Off Tubing, Pipe and Shafting . . . FAST

Cuts off longer pieces than a regular automatic machine. In fact, cuts off *any* length you want—and cuts *faster*. If your production requires quantity cutting-off of tubing, pipe or shafting, check the figures below against your present time.

1/2" Tubing

This machine cuts off and chamfers both outside edges of 1/2" .030 wall tubing, 5" long at the rate of one every 2.5 seconds.

1 1/4" Cold Rolled

This machine cuts off and chamfers both ends of 1 1/4" cold rolled, 20" long, at the rate of one every 20 seconds.

1" Tubing

This machine cuts off and chamfers both outside edges of 1" tubing, 3" long, at the rate of one every 3 seconds.

These popular, time saving machines are now available in four sizes, handling work up to 6 3/4" O.D. Their many cost cutting features are described and illustrated in our latest catalog that will be mailed promptly on request.

WRITE FOR ILLUSTRATED CATALOG

MODERN MACHINE TOOL COMPANY
Jackson, Michigan

**For heavy duty
precision
drilling . . .**

**It's a
Jacobs
CHUCK**

Jacobs and your industrial supply distributor are ready to deliver the chucks you need and the service you deserve. First in chucks . . . first in service.

THE JACOBS MANUFACTURING COMPANY • WEST HARTFORD, CONN.



The Jacobs Model 91 Spindle Nose Collet Chuck for tool room and engine lathes.



The Jacobs Rubber-Flex® Tap Chuck for tapping heads and impact tools.



The Jacobs Ball Bearing Super Chuck for heavy duty and precision industrial use.



The Jacobs Model 96 Collet Chuck for grinding machines, millers and jig-borers.



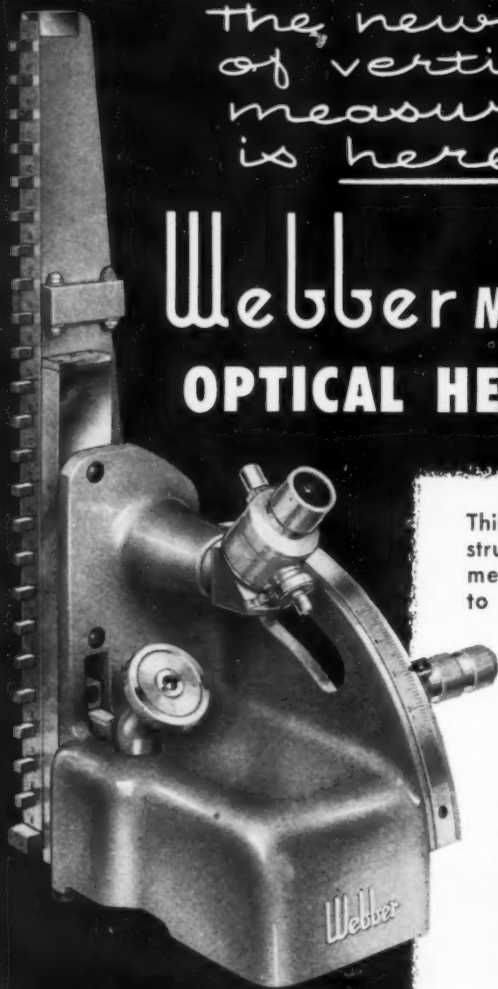
The Jacobs Plain Bearing Chuck for drill presses, portable electric and air tools.



The Jacobs Impact Keyless Chuck especially designed for the aircraft industry.

*the new concept
of vertical
measurement
is here*

Webber Micro-Accurate OPTICAL HEIGHT GAGE



This revolutionary new instrument will make micro measurements in the 1" to 61" range with an hitherto unknown overall accuracy of $\pm .000005$ " per inch.

These fantastic measurements are made speedily and easily by the average skilled workman.

Next to your Gage Blocks the new Webber Optical Height Gage will be the most useful tool in your shop. There is nothing like it in all the world.

Webber GAGE CO.

12905 Triskett Rd., Cleveland 11, Ohio

WHEN SHARPENING DRILLS

PRECISION

IS ALL-IMPORTANT...

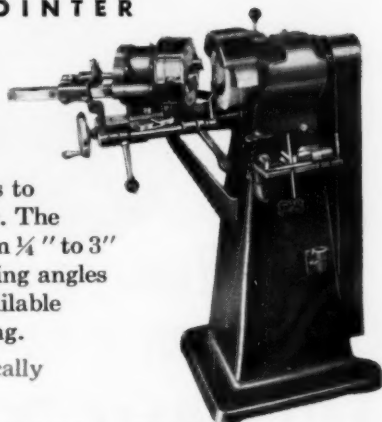
THE

Oliver

DRILL POINTER

With the Oliver 510 Drill Pointer, all of the movements in sharpening a drill are automatic, and accomplished by fixed mechanisms to eliminate all chance of error. The Oliver 510 holds all drills from $\frac{1}{4}$ " to 3" diameter and provides varying angles from 82 to 160 degrees. Available for either wet or dry grinding.

Oliver achieves the theoretically perfect point.



SEND A FEW DRILLS FOR FREE RESHARPENING . . . THEN BUY!

Oliver

INSTRUMENT •
• COMPANY

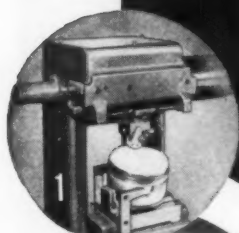
1408 EAST MAUMEE



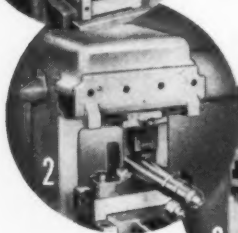
ADRIAN, MICHIGAN

FACE MILL GRINDERS • AUTOMATIC DRILL GRINDERS • DIE MAKING MACHINES
TOOL & CUTTER GRINDERS • DRILL POINT THINNERS • TEMPLATE TOOL GRINDERS

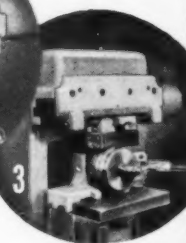
THE MOST
Versatile
MARKING
MACHINE
ever built



1

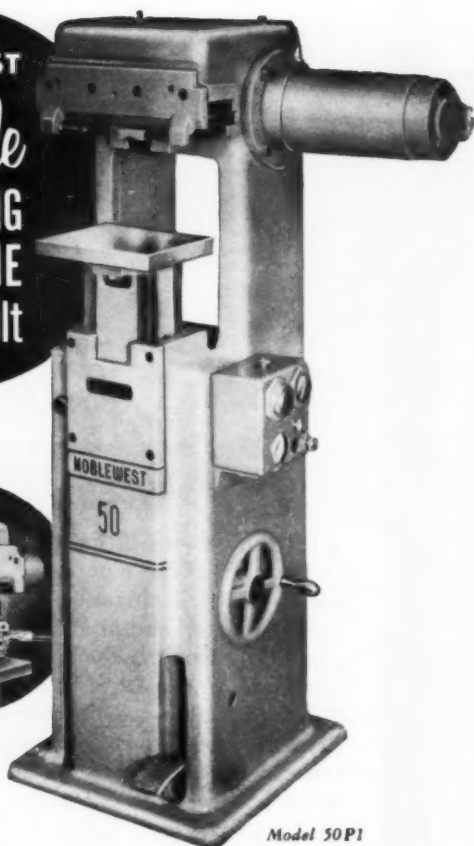


2



3

- 1 Roll-Marking into Surface of Piston
- 2 Serial Numbering into Metal Shaft
- 3 Permanent Marking and Graduating into Metal Collar



Model 50P1

ROLL-O-MARK
Multi-Purpose
All-Pneumatic
MARKING MACHINE

Whatever your needs for metal marking, Noblewest makes the machines, marking dies, and work-holding fixtures for doing the complete job faster, better, at lower cost. And remember, Noblewest Roll-Marking is *permanent* marking—good for the life of your product. Write Noble & Westbrook Manufacturing Company, 9 Westbrook street, East Hartford 8, Conn.



MARK IT BEST WITH

NOBLEWEST

Circle No. 245 on Card, Opposite Page 65



A-L TOOL STEELS are clearly marked ... you can't mix up grades in your stock



**For
Production Men Only
"TOOL STEEL HANDBOOK"**

We say "production men only" because this is a *work* book, not a picture book. It's a case-bound volume of 196 pages, packed full of technical data on the analyses, uses, handling and shop treatment of all grades of A-L Tool and Die Steels. Sent free, but ask for it on your company letterhead, please.

Address Dept. MB-82

"What's *that* piece?" . . . "Are you sure?" . . . In anybody's toolroom or stock racks, the best inventory or material identification system is apt to go haywire once in a while—and sometimes with grievous results.

But not when you're using tool steel grades produced by Allegheny Ludlum! Each length of AL Tool Steel is clearly marked with its grade name every few inches the entire length of the bar—stenciled in such a manner that the

marking stays bright and clear, and can't be blurred or erased in handling.

Even a small crop end on a machine bench is readily identifiable—you can't go wrong. And that's only a small part of the benefit you can realize by using AL Tool Steels—available from stocks coast to coast. Let our Metallurgical Service go to bat on some of your tougher tool steel problems. Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.

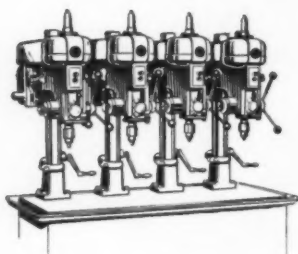
For nearest representative, consult Yellow Section of your telephone book.

For complete **MODERN** Tooling, call
Allegheny Ludlum





**6" Spindle travel means
BIG MACHINE capacity
in this 15" Drill Press!**



You don't have to go to a 20" or larger drill press to get 6" spindle travel. With this 15" Walker-Turner, you can drill holes up to 6" deep at one pass of the drill, in diameters from #60 to 1/2".

This extra-capacity "LIGHT-HEAVY-WEIGHT" is built to deliver fast, accurate production drilling in your plant, 24 hours a day, for a long span of years.

1300 Series — Walker-Turner "Light-Heavyweight" 15" Drill Press — full 6" spindle travel; six-spline, full floating

spindle; speeds from 480 to 5000 rpm, depending on motor and pulleys; Jacobs Chuck, or No. 1 Morse taper available. (15" Walker-Turner "LIGHT-HEAVY-WEIGHT" Drill Press with 4" spindle travel — 1200 series — also available.)

Ask your Walker-Turner Distributor to *demonstrate* the big capacity of this 15" W-T Drill Press. He's listed under "Tools" in your phone book's Yellow Pages. Or write for his name and full specifications on these machines.

DRILL PRESSES, HAND AND POWER FEED — AIR FEED DRILL PRESS ATTACHMENT
RADIAL DRILLS — WOOD AND METAL CUTTING BAND SAWS — TILTING ARBOR SAWS
RADIAL SAWS — JIG SAWS — CUT-OFF SAWS — LATHES — SPINDLE SHAPERS
JOINTERS — BELT AND DISC SURFACERS — FLEXIBLE SHAFT MACHINES

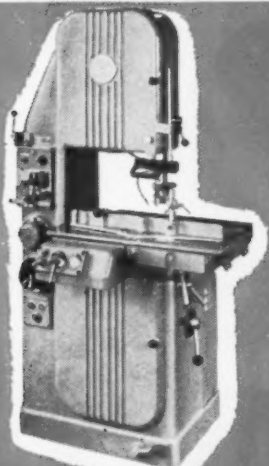


WALKER-TURNER

Division

Rockwell Manufacturing Co. • Pittsburgh 8, Pa.

OUTSTANDING NEW MACHINERY AT LOWER COST! LIBERAL TERMS RENTAL PLANS

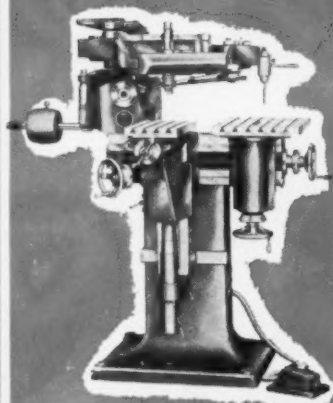


**Kelle Model K-16 Vertical Contour
Metal Cutting Bandsaw**

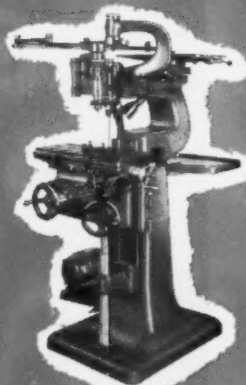
Cutting speeds from 33 to 2400 ft.
per. min. Table swivels 15° on
four sides.

\$1495.00

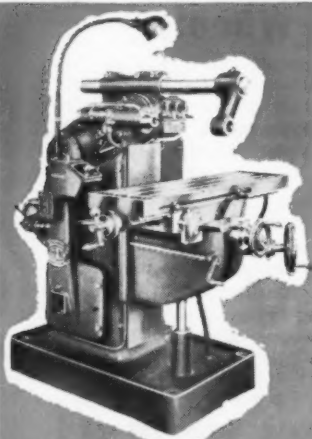
UNUSUAL HIGH PRECISION PEAR 3 and 2 dimensional Pantograph Engravers



PEAR
3 Dimensional
Model PF/2
\$2695.00



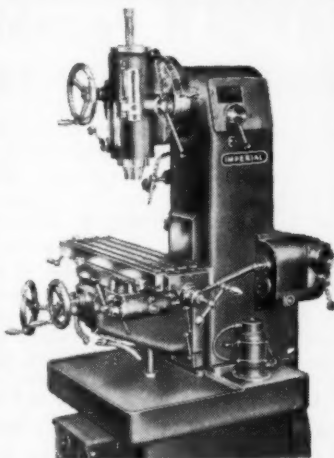
PEAR
2 Dimensional
Model CG/3
\$1495.00



ABENE

Combined Vertical-Horizontal
MILLING MACHINES

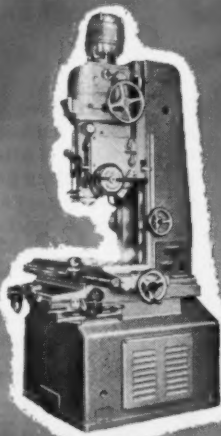
\$3990.00



IMPERIAL

VERTICAL MILLING MACHINE

\$1595.00



STARRETT

Optical Jig Borer

AARON MACHINERY CO., INC.

Dept. B • 45 Crosby St., New York 12, N.Y. • WA 5-8300 See Page 37
Branches at: Buffalo, N. Y.; Mineola, N. Y.; Los Angeles, California



MANHATTAN Portable Wheels Built For Your Job

Type of abrasive, grain size, hardness, structure in rubber or resinoid bond—all are selected after a careful analysis of: your grinding problems, the amount of metal removal, the finish your operations require. The result is that every type of Manhattan Portable



Wheel—flared cup, raised hub, cone or plug and mounted points, as well as straight wheels—removes

more metal, faster, and at lower cost.

You get more pieces done . . . more output per man hour . . . plus uniform quality production and longer wheel life. It means "More Use per Dollar" for all grinding operations at your plant. Let a Manhattan sales engineer tell you about Manhattan Portable Wheels and other types of high speed, heavy duty abrasive wheels . . . engineered with your job in mind.

RM 640-R

WRITE TO ABRASIVE WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY



RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose Fan Belts • Brake Linings & Blocks • Clutch Facings • Packings • Asbestos Textiles Engineered Plastic, and Sintered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

Circle No. 249 on Card, Opposite Page 65

SETTING

PRODUCTION RECORDS

for large hole tapping!

**New heavy duty
"TAP KING"**

You'll marvel at the speed, power and precision of your finger tips when you operate this remarkable tapping unit. Designed specifically for large hole tapping, in heavy materials, it has repeatedly demonstrated its superiority on many difficult jobs. Here are just a few samples of the kind of work you can expect with the Tap King: "on open hole tapping in carbon steel forgings—production increased 50%"—"on blind tapping in steel castings—production up 100%"—"tapping in 1½" steel plate—a class 2 fit was maintained with ease". The Tap King assures you better finished parts, less spoilage, fewer broken taps, faster, easier operation and greater production. Discover how far you can go in improving **your** tapping operations and reducing costs.



Write for FREE brochure

giving you full details and specifications on this amazing unit.

PROCUNIER SAFETY CHUCK CO.

14 S. Clinton St., Dept. 10, Chicago 6, Ill.

Gentleman:

Please send your Free Illustrated Brochure

Name.....

Address.....

City.....Zone.....State.....

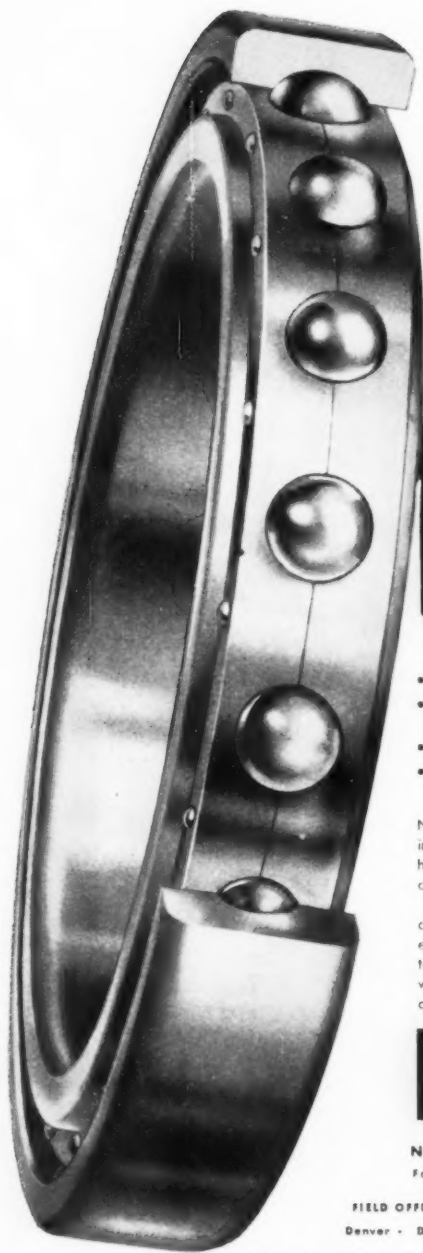


**NEW
heavy duty
"TAP KING"**

EXCLUSIVE

tru-grip tap holder
smaller, lighter,
permits tapping
close to walls and
shoulders

PROCUNIER
Safety Chuck Company
14 S. Clinton Street • Chicago 6, Illinois



Solve Bearing Space Limitation Problems

WITH
NORMA-HOFFMANN
EXTRA LIGHT
XLS Series Precision Bearings

Advantages

- Have unusually large bores compared to outside diameter
- Provide utmost in accuracy, rigidity, and load capacity — (radial and thrust)
- Are compact, light in weight
- Allow greater freedom in design. In many cases these bearings provide the only solution where space is at a premium.

Norma-Hoffmann "XLS" Extra Light Inch Series Ball Bearings provide engineers and designers the advantage of high anti-friction performance plus space saving. They are ideal for hollow shafts.

These bearings are self-contained, non-separable and are suitable for combined radial and thrust loads in either direction. They are available in sizes from 1 3/8" to 22 1/2" bore. Our Field Engineers will gladly help you with your bearing problems. Write for their assistance and catalog.

NORMA-HOFFMANN
Precision **BEARINGS**
BALL • ROLLER • THRUST

NORMA-HOFFMANN BEARINGS CORPORATION

Founded in 1911

STAMFORD, CONNECTICUT

FIELD OFFICES: Atlanta • Chicago • Cincinnati • Cleveland • Dallas •
Denver • Detroit • Kansas City • Los Angeles • San Francisco • Seattle

Circle No. 251 on Card, Opposite Page 65

Logan

- 12" SWING
- 1" COLLET CAPACITY
- 1 3/4" SPINDLE BORE
- 23" and 35" CENTERS
- VARIABLE SPEED OR
DOUBLE V-BELT DRIVE

ACCURACY, CAPACITY AND POWER COMBINED IN THIS 12" LATHE

This 12" swing lathe typifies Logan advanced design and rugged construction. Gears are extra wide and strong. Shafts are extra heavy. The lead screw has a full 7/8" diameter.

The precision carriage rides on a two-V-way, two-flat-way bed that is rugged, precision ground and warp-free. The heavy spindle turns on oversize ball bearings, no bearing adjustment needed for any speed between 38 and 1575 rpm.

This lathe, and every Logan Lathe from 14" swing down to 9" swing, is dynamically balanced before it is shipped. The result is *sustained accuracy* and smooth, quiet power on every lathe turning operation. See your Logan Lathe dealer for more facts—or mail us the coupon below.



No. 2557-V
12" Swing,
Variable Speed Drive
35" Centers

THIS COUPON
will bring you full details
on Logan Lathe construction
and specifications.

LOGAN ENGINEERING CO.

4901 West Lawrence Avenue, Chicago 30, Ill.

Send me full facts on the Logan line.

Name.....

Company.....

Street.....

City.....Zone....State.....

Circle No. 252 on Card, Opposite Page 65

SPECIAL JOBS with STANDARD TOOLS

Thread Recessing

Bokum produces standard tools designed to give perfect threads in blind holes. These tools allow a run over with your threading tool or tap in production to help insure a perfect thread to the full depth of the hole. Most thread sizes are available. Write for Catalog T-R.

TR-3



Back Chamfering

Here's another Bokum standard recessing tool. When you back chamfer a finished bore, you get a cleaner and easier cut off without a burr on the finished bored end of the part. Bokum produces these tools to conform to standard screw machine tool holder sizes. Write for Catalog B-CH.

B-CH-3



O-Ring Grooves

Bokum grooving tools produce the precise grooves needed for O-rings—meet the exact specifications of ring manufacturers. 15 different tools are available from stock for single O-rings, or for O-rings requiring one or two back ups. Larger diameters feature 2-piece construction. Write for Catalog O-R.

OR-103



Retaining Ring Grooves

Bokum produces a range of 29 tools to cut exact grooves for standard, inverted, bowed, beveled and self-locking retaining rings. 2-piece construction on larger diameters permits use of any length bar to compensate for the distance of the groove from the end of the work piece. Write for Catalog R-R.

RR-SV-46

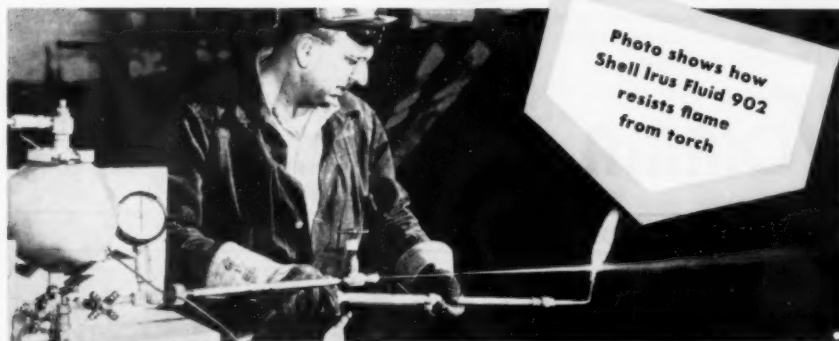
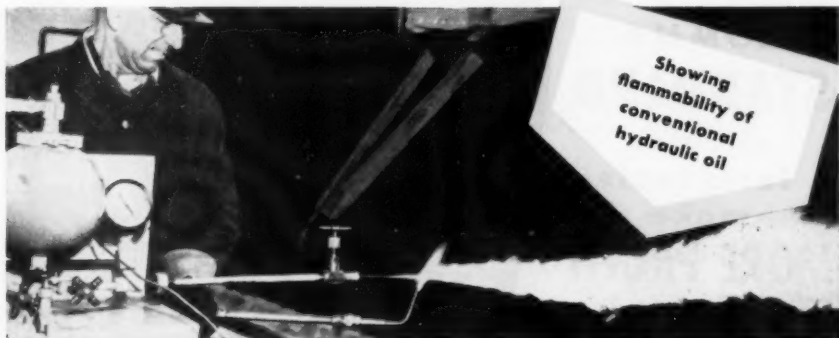


TRADE MARK REG. U. S. PAT. OFF.

All tools available high speed steel or carbide tipped. All are standard tools—for economy!

BOKUM TOOL CO.

14775 Wildemere Ave.,
Detroit 38, Mich.



Flame tests prove its fire-snuffing ability

Entirely new formula: Shell Irus Fluid 902 is a special formulation . . . product of three years' development and field testing. It is suitable for nearly all industrial hydraulic systems, as a direct replacement for presently used oils. *Here is a fire-resistant hydraulic fluid that can be widely used.*

Non-corrosive: Shell Irus Fluid 902 contains no corrosive ingredients. It has

no harmful effects on seals, fittings or bearings. It does not promote rust.

No major modification necessary . . . simply clean present fluid thoroughly out of system and replace directly with Shell Irus Fluid 902. You can use it with complete confidence. *Write for test data and all information to*

SHELL OIL COMPANY
50 West 50th St., New York 20, New York
or 100 Bush St., San Francisco 6, California

SHELL IRUS FLUID 902



Circle No. 254 on Card, Opposite Page 65

SOMMA STANDARD circular form tools make MORE PROFIT

Now you can save time and money on a wide variety of form tool operations by replacing costly made-to-order or hand ground tools with Somma Standard Circular Form Tools.

Somma

TOOL CO., INC. 21 BROWN STREET, WATERBURY, CONN.

West Coast Warehouse: 576 N. Prairie, Hawthorne, Cal.

ON THESE OPERATIONS



In addition you are assured of uniform accurate dimensions every time, easier set-ups and a better finish on the parts.

And Somma Standard Tools are available through the Somma representative in your area.

Write for new catalog and price list of standard tools and blanks.

Circle No. 255 on Card, Opposite Page 65

District Managers

MACHINE and TOOL BLUE BOOK

EASTERN DIVISION

Dan E. Reardon, V.P. in charge
c/o Hitchcock Publishing Co.
55 West 42nd Street
New York 36, N.Y.
Telephone: LAckawanna 4-4528

CONNECTICUT

Dan E. Reardon, V.P.
Box No. 1, South Glastonbury, Conn.
Telephone: WEddford 3-7083

NEW YORK, METROPOLITAN AREA, EASTERN PENNA., CENTRAL N.Y. STATE, N.J., MD., DELA., D. of C.

Raymond J. Sietema
c/o Hitchcock Publishing Co.
55 West 42nd Street
New York 36, N.Y.
Telephone: LAckawanna 4-4528
Home telephone: (N.J.) CEnter 9-4364

MAINE, N.H., VERMONT, MASS., R.I.
Donald J. Leverich
49 Standish Rd.,
Stamford, Conn.

CENTRAL DIVISION

SOUTHERN COOK COUNTY, ILL.; SOUTHERN OHIO, INDIANA

Henry J. Smith, V.P. in charge
c/o Hitchcock Publishing Co.
272 East Willow Avenue
Wheaton, Illinois
Telephone: WHeaton 8-3400

HITCHCOCK PUBLISHING CO. •

MICHIGAN, WESTERN OHIO

James C. Stewart, V.P.
18055 James Couzens Highway
Detroit 35, Michigan
Telephone: DIamond 1-9525

NORTHERN ILL., NORTHERN COOK COUNTY, WISC., MINN., UPPER PENINSULA of MICH., & S. DAKOTA

Robert G. Bolinder
c/o Hitchcock Publishing Co.
222 East Willow Avenue
Wheaton, Illinois
Telephone: WHeaton 8-3400

WESTERN NEW YORK STATE, WESTERN PENNA., EASTERN OHIO

Ralph E. Helfrick
1507 Edgefield Road
Cleveland 24, Ohio
Telephone: Hillcrest 2-0189

SOUTHERN ILLINOIS, MISSOURI, IOWA

Ralph B. Payne, Jr.
c/o Hitchcock Publishing Co.
222 East Willow Avenue
Wheaton, Illinois
Telephone: WHeaton 8-3400

WESTERN DIVISION

CALIFORNIA, ARIZONA

Kath H. Evans
3723 Wilshire Boulevard
Los Angeles 5, California
Telephone: DUmkirk 8-2981
and
593 Market St. (Room 304)
San Francisco 5, California
Telephone: YUken 2-4280

OREGON, WASHINGTON

Lloyd Thorpe
531 Medical Arts Building
Seattle 1, Washington
Telephone: MAin 6827

Telephone WH 8-3400 • Wheaton, Ill.

TOOLS OF TOMORROW

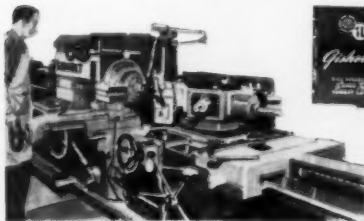
New GISHOLT MASTERLINE SADDLE TYPE TURRET LATHE

WANT MAXIMUM OUTPUT AND ACCURACY from today's carbide tools—with an ample reserve of power and speeds to meet tomorrow's tooling requirements?

That's what you'll get—*now*—from this powerful, rugged Gisholt MASTERLINE Saddle Type Turret Lathe. Prime example of this machine's advanced features is the rugged Headstock Gear Train, shown at the left. Here, you can get 24 different forward speeds—all from a *single*-speed motor. This means you get *full* power *all* the time—a critically important feature for those heavy cuts at punishing feeds.

But that's not all. To give you maximum performance from this powerful gear train, Gisholt designers have backed it with faster speed changes through the Hydraulic Speed Selector (effortless speed shifts without waiting or computing); a hydraulically operated Hi-Lo speed change in a 6:1 ratio (without stopping the spindle or shifting gears); and a new Self-Adjusting Electric Clutch and Brake (smooth, fast starting and stopping, plus more accurate inching of the spindle).

Ask your Gisholt Representative to give you the complete facts. Why not call him today?



ASK FOR complete
set of Gisholt
MASTERLINE
Saddle Type Turret
Lathe Bulletins.

GISHOLT

MACHINE COMPANY



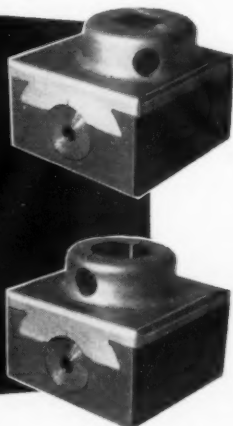
Madison 10, Wisconsin, U. S. A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS
BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

Which boring head will do your job?

CRITERION makes a wide range —
1½ to 7 inches in diameter.
Bore accurate holes ¼ to 20 inches.

CRITERION Heads feature widely
spaced graduations — Easy reading
— Accurate adjustment — Rugged
construction — Dependable operation.
Built for long life and chatter-
free performance.



Ground shanks
and adapters
for all popular
machine tools

CRITERION TOOL PRODUCTS



Select your boring head
for **ROUND** or **SQUARE**
shank tools.

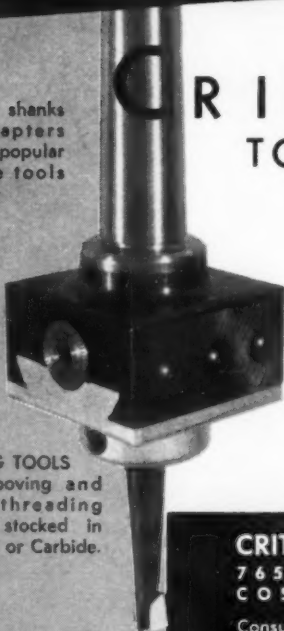
DIVERSIFIED OPERATION

Check the application of
these tools on Turrets or
Automatic Lathes.

MAXIMUM OFFSET TRAVEL

Save time—Money—Elim-
inate excessive tool change.

BORING TOOLS
Boring, grooving and
internal threading
tools are stocked in
High Speed or Carbide.



CRITERION MACHINE WORKS
765 WEST SIXTEENTH STREET
COSTA MESA, CALIFORNIA

Consult your dealer or write for free catalog.

FIRST CLASS
PERMIT NO. 272

WHEATON, ILLINOIS

BUSINESS REPLY CARD

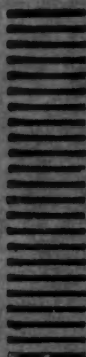
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3c POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS



FIRST CLASS
PERMIT NO. 272

WHEATON, ILLINOIS

BUSINESS REPLY CARD

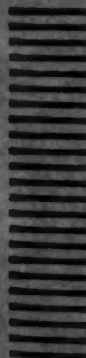
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3c POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS



October, 1956 For free information . . . use these postage-free Action Cards

Advertisements

																circle key numbers			
201	226	251	276	301	326	351	376	401	426	451	476	501	526	551	576				
202	227	252	277	302	327	352	377	402	427	452	477	502	527	552	577				
203	228	253	278	303	328	353	378	403	428	453	478	503	528	553	578				
204	229	254	279	304	329	354	379	404	429	454	479	504	529	554	579				
205	230	255	280	305	330	355	380	405	430	455	480	505	530	555	580				
206	231	256	281	306	331	356	381	406	431	456	481	506	531	556	581				
207	232	257	282	307	332	357	382	407	432	457	482	507	532	557	582				
208	233	258	283	308	333	358	383	408	433	458	483	508	533	558	583				
209	234	259	284	309	334	359	384	409	434	459	484	509	534	559	584				
210	235	260	285	310	335	360	385	410	435	460	485	510	535	560	585				
211	236	261	286	311	336	361	386	411	436	461	486	511	536	561	586				
212	237	262	287	312	337	362	387	412	437	462	487	512	537	562	587				
213	238	263	288	313	338	363	388	413	438	463	488	513	538	563	588				
214	239	264	289	314	339	364	389	414	439	464	489	514	539	564	589				
215	240	265	290	315	340	365	390	415	440	465	490	515	540	565	590				
216	241	266	291	316	341	366	391	416	441	466	491	516	541	566	591				
217	242	267	292	317	342	367	392	417	442	467	492	517	542	567	592				
218	243	268	293	318	343	368	393	418	443	468	493	518	543	568	593				
219	244	269	294	319	344	369	394	419	444	469	494	519	544	569	594				
220	245	270	295	320	345	370	395	420	445	470	495	520	545	570	595				
221	246	271	296	321	346	371	396	421	446	471	496	521	546	571	596				
222	247	272	297	322	347	372	397	422	447	472	497	522	547	572	597				
223	248	273	298	323	348	373	398	423	448	473	498	523	548	573	598				
224	249	274	299	324	349	374	399	424	449	474	499	524	549	574	599				
225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600				

Inside Front Cover Inside Back Cover Back Cover
 Inserts: 1A 1B 1C 1D 2A 2B 2C 2D 3A 3B 3C 3D

Company.....

Name..... Position.....

Street.....

City..... Zone..... State.....

October, 1956 For free information . . . use these postage-free Action Cards

Free Literature circle key numbers

1	11	21	31	41	51	61	71
2	12	22	32	42	52	62	72
3	13	23	33	43	53	63	73
4	14	24	34	44	54	64	74
5	15	25	35	45	55	65	75
6	16	26	36	46	56	66	76
7	17	27	37	47	57	67	77
8	18	28	38	48	58	68	78
9	19	29	39	49	59	69	79
10	20	30	40	50	60	70	80

New Products circle key numbers

81	91	101	111	121	131	141	151	161	171
82	92	102	112	122	132	142	152	162	172
83	93	103	113	123	133	143	153	163	173
84	94	104	114	124	134	144	154	164	174
85	95	105	115	125	135	145	155	165	175
86	96	106	116	126	136	146	156	166	176
87	97	107	117	127	137	147	157	167	177
88	98	108	118	128	138	148	158	168	178
89	99	109	119	129	139	149	159	169	179
90	100	110	120	130	140	150	160	170	180

Company.....

Name..... Position.....

Street.....

City..... Zone..... State.....

GREEN

Model D-2

Pantograph Engraver

Unique design of the two dimensional Model D-2 features — Single micrometer adjustment controls vertical depth of cut, and adjusts height of copy table and pantograph.

Range of ratios from 2 to 1 to infinity!

Accessibility on three sides permitting panels up to 30" diameter to be engraved, milled or profiled.

Vertical range over 10" allowing operations on complete chassis, cabinets or other bulky objects. Ruggedness, stability and precise accuracy, inherent in construction.

Mounted on the Green Engraver Bench, ruggedly constructed of heavy duty steel, this D-2 compact unit provides a highly efficient pantograph engraver assembly. All functional parts are conveniently within reach of the operator while seated. Accessibility of master type sets stored in lower cabinet trays, tools and accessories contribute to productive capacity.

A brochure with full details is yours upon request.

Literature also available on the smaller Model 106 three dimensional engraver.

GREEN INSTRUMENT COMPANY

386 Putnam Ave., Cambridge, Mass.

Circle No. 265 on Card, Opposite Page 65

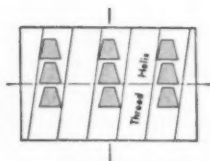
**BARBER-
COLMAN**
offers

*thread
milling
requires
accurate
cutter
design!*

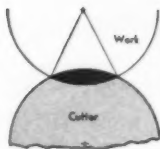
**mathematical computation
of cutter form**

Multiple thread milling cutters often produce a thread space form which is not a duplicate of the cutter tooth form. The cutter tooth form is not a duplicate because the cutter tooth rotates in a plane which is perpendicular to the work axis and at an angle to the thread helix. This generating action produces a fillet at the bottom of the threads, and a thread space which is wider than the cutter tooth. When the amount of generating produces an unsatisfactory thread form, the cutter must be developed to produce the desired thread tooth thickness without fillet interference.

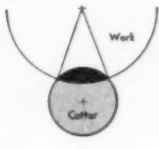
Whenever required, Barber-Colman engineers, by mathematical computation, design the correct cutter which compensates for the generating action. In this computation, the diameter of the cutter is very important since the amount of tooth form correction increases as the diameter of the cutter increases. A thread produced by a specially-developed cutter will have an accurate form which will fit the gage with the desired bearing.



This schematic drawing shows how a multiple thread milling cutter produces a thread space which is wider than the cutter tooth. The cutter is set so that the plane of rotation of the cutter teeth is perpendicular to the work axis, and at an angle to the thread helix.



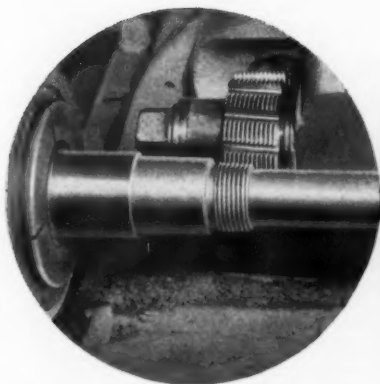
Large diameter cutters have greater length of contact and produce more pronounced fillets.



Small diameter cutters have less length of contact and produce smaller fillets.

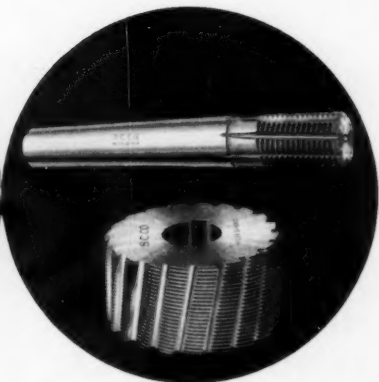


In some cases, cutters mill deeper than true thread form. Any generated fillets which may be cut are then below the gaging surface of the thread. Correct cutter design takes care of this automatically.



original cutter accuracy in resharpener

All Barber-Colman form-relieved milling cutters are accurately index-sharpened on Barber-Colman automatic sharpening machines, so that all cutter teeth are the same height and accurately spaced. This makes it easy to maintain original cutter accuracy when resharpener either on automatic sharpeners, or on conventional sharpening equipment using the accurately indexed cutter teeth as a reference. In either case, accurate sharpening to original tolerances is easily maintained, and cutter sharpening time is reduced to a minimum.



design elements for maximum performance

With the proper tooth form developed to cut accurate threads, the engineers then analyze the job conditions to determine which cutter features will produce best cutter performance. These features include selection of the proper cutter material, shell or shank type cutters, straight or helical flutes, rake teeth, axial relief and intermittent teeth if sharp threads are desired. Since we make all classes of ground and unground thread milling cutters, we can recommend the cutter accuracy required for your job.

When you have a threading problem, consult Barber-Colman cutter engineers for their recommendations on the proper cutters for the job. Be sure the cutters you have are accurately designed to cut the correct thread form. Send us blueprints of your threaded parts for quotation on thread milling cutters designed to produce correct threads.

BARBER-COLMAN COMPANY

8510 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines





PRECISION MILLING

calls for this

POPE

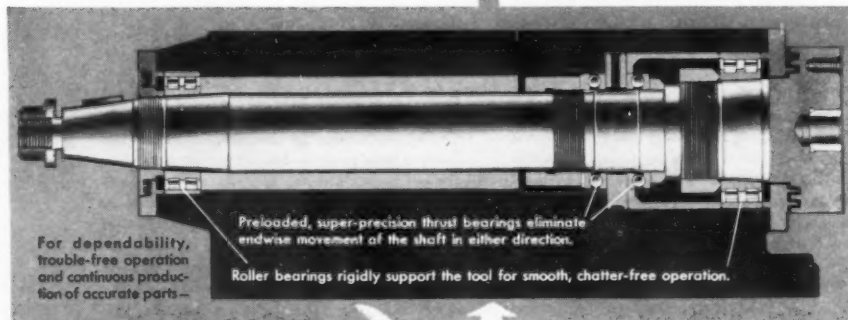
Heavy Duty

MILLING SPINDLE

See for yourself! Here is one sturdy package with a massive shaft, and double row cylindrical roller bearings and ball thrust bearings that support your cutting tools rigidly to do their best work.

POPE P-12000 Series Belt Driven Precision Milling Spindles are operable in any position. They come in sizes from 1 to 50 HP with standard milling machine tapers in the nose from #10 to #60. Bulletin S-8 gives complete dimensions. Let us mail you a copy.

POPE Heavy Duty Milling Spindles are also available in P-2500 Series, MOTORIZED, from 1 to 100 HP, totally enclosed, fan cooled; and in high cycle, water cooled units.



For dependability, trouble-free operation and continuous production of accurate parts—

Preloaded, super-precision thrust bearings eliminate endwise movement of the shaft in either direction.

Roller bearings rigidly support the tool for smooth, chatter-free operation.

PRECISION BORING

calls for this

POPE

Heavy Duty

BORING SPINDLE

Look it over! Here is a Boring Spindle capable of boring holes round within *millionths of an inch*. It produces fine surface finishes in the lower micro inch range.

POPE Super-Precision Heavy Duty Boring Spindles are available in both belt driven and motorized units to meet a wide range of speeds and horsepower. Send us your specifications for quotations.

Pope designs, engineers and builds
SPECIAL SPINDLES

No. 112

Specify

POPE

POPE MACHINERY CORPORATION

Established 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS

PRECISION SPINDLES

Circle No. 266 on Card, Opposite Page 65

THE R and L LINE SAVES TIME



TURNING TOOL



TURNING TOOL

TAP AND DIE HOLDERS



UNIVERSAL TOOL POST



RECESSING TOOL



FLOATING DRILL HOLDER

Here's how R and L TOOLS pay for themselves

These tools have been described as "tools a particular machinist would design for himself". Famous throughout the world for their time and labor-saving features... their durability... their quality, R and L TOOLS are truly masterpieces of the toolmaker's art.

- Speed Set-up Time
- Speed production
- Reduce rejects to absolute minimum

Write for new catalog

R and L TOOLS
1825 BRISTOL STREET - PHILADELPHIA 40, PA.

TURNING TOOL • CHAMFER OR ROLLER BACKRESTS • RELEASES ON ROP
RELEASING TAP AND DIE HOLDERS • RELEASES ON HOLDER FOR SCREW DRILL
UNIVERSAL TOOL POST • CUT-OFF BLADE HOLDER • RECESSING TOOL
FLOATING DRILL HOLDER • TURNING TOOL

R and L TOOLS
1825 Bristol Street, Philadelphia 40, Pa.

- ☐ Send new catalog
☐ Please have representative call.

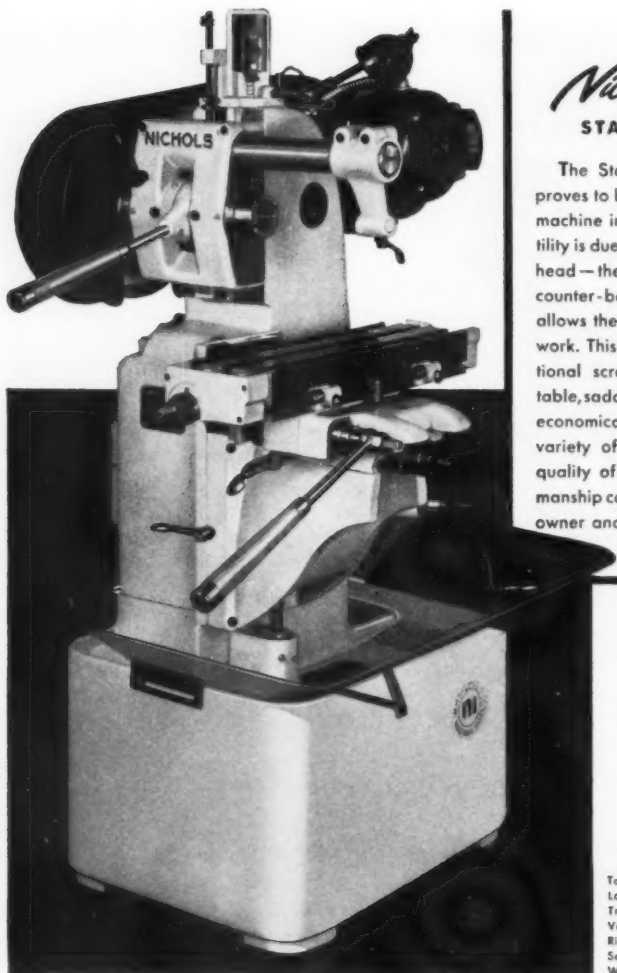
NAME

COMPANY

ADDRESS

BB10-58

Circle No. 267 on Card, Opposite Page 65



Nichols Miller STANDARD MODEL

The Standard Nichols Miller often proves to be the handiest (and busiest) machine in the shop. Its unusual versatility is due to the "rise and fall" spindle head—the spindle being mounted in a counter-balanced sliding head which allows the cutter to be brought to the work. This unique feature, plus conventional screw or lever movements of table, saddle and knee, guarantees fast, economical production on the widest variety of parts. And the unexcelled quality of Nichols' design and workmanship commands the respect of every owner and operator.

*"the miller that
uses its head!"*

CONDENSED SPECIFICATIONS

Table Working Surface	6 1/2" x 21" or 30"
Longitudinal Travel	10" or 19"
Transverse Travel	7"
Vertical Travel—Knee	13 1/2"
Rise and Fall of Spindle	4 1/2"
Selective Speed Ranges up to	5000 R. P. M.
Weight	1250 lbs.

Write today for the Nichols general catalog, which describes the six models of Nichols Millers. A sound, color movie, "the Miller that Uses its Head" is available for free showing. May we reserve it for you?



MANUFACTURED BY W. H. NICHOLS COMPANY • WALTHAM, MASSACHUSETTS

NATIONAL DISTRIBUTORS **NICHOLS-MORRIS CORPORATION**

76-G Mamareneck Ave.
White Plains, N.Y.



Leading **MACHINISTS** and **TOOLMAKERS**



Precision Ground
SOLID CARBIDE TOOLS



Write today for your copy of the complete
ATRAX CATALOG of Carbide Tools containing
recommended applications and selection tables.

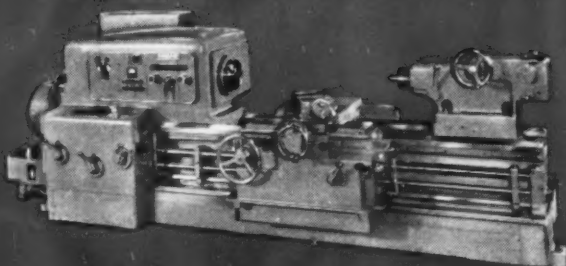


THE ATRAX COMPANY

Newington 11, Conn.

Every Feature Worth a Close, Close Look!

Series 80 Dyna-Shift



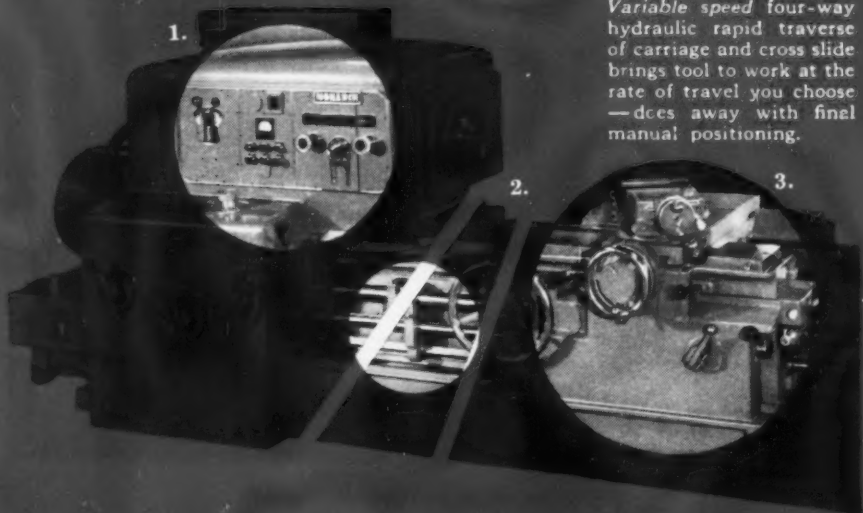
Models 1600 and 1601—Clearance diameter 26" and 30". Swing over cross slide 16" and 20". Speed 10-1250 RPM.

Models 2000 and 2001—Clearance diameter 32" and 36". Swing over cross slide 20" and 24". Speed 8-1000 RPM.

1. Headstock With a Brain! Dial work diameter setting and surface cutting speed setting. Dyna-Shift headstock *automatically calculates* required spindle speed and shifts to it hydraulically. No mental gymnastics—no compromise speeds!

2. Support Without a Thought. On longer bed lathes, the leadscrew, feed and control rods are continually supported by traveling carriers that are automatically picked up and dropped off by apron movement.

3. Infinitely Variable
—Infinitely Effective. Variable speed four-way hydraulic rapid traverse of carriage and cross slide brings tool to work at the rate of travel you choose—does away with final manual positioning.



The Monarch Series 80 DYNA-SHIFT... The New Look in Heavy-Duty Lathes

Monarch Series 80 Dyna-Shift Lathe.

◀ 36 Spindle Speeds. Headstock Ratio—125 to 1.

In the Series 80, you get double the usual metal removal rate, or 2 cu. in. per H.P. See too, the new chip-chute bed design for easy chip disposal and the clean, close lathe front with spindle right in your hands.

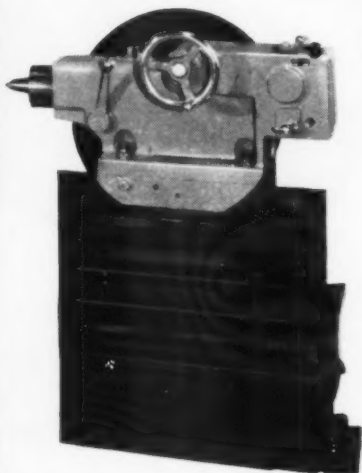
Nimble Tailstock.

Two speed range spindle movement — *power positioning* provided by engaging plunger on carriage and using longitudinal power rapid traverse.

▼

Here's the lathe that's the talk of shop and front office alike! The new Monarch Series 80 Dyna-Shift provides a completely new approach to the problem of heavy-duty metal turning—and the results are a rate of metal removal beyond the reach of previous designs; plus added production caused by the many exclusive new built-in conveniences.

A look at just the few features pictured here tells why. Every one adds to the increased productivity and ease of operation of the machine. And there are so many more that we've prepared a complete, illustrated booklet to tell you about them. For full information on the lathe that gives you ultimate proficiency in the use of carbide tooling on work of considerable size—send for our Booklet #1602
**The Monarch Machine Tool Company,
Sidney, Ohio**



Clip this coupon
to your letterhead
for complete
Dyna-Shift Booklet.

▼

**The Monarch Machine Tool Co.
Sidney, Ohio**

Please send me your illustrated booklet
#1602 describing the Series 80 Dyna-Shift
Lathe.

NAME _____

TITLE _____

FOR MILLIONS OF GEARS

...Fellows



Fellows Heliguide Hobbing Machine cuts a 37-tooth gear in SAE 4027 carburizing steel on one spindle and a 27-tooth gear on the other. Production, each spindle: 35 gears per hour.



Fellows No. 4GS Gear Shaper cuts twelve 32-tooth, 7 D.P., $\frac{3}{4}$ " face helical gears per hour or seven 15-tooth, 6 D.P., 2-1/16" face spur gears per hour. Set-up shown is for 20-tooth helical on countershaft.



THE
PRECISION
LINE

A YEAR

Speed and Accuracy!

Over nine million gears a year for truck transmissions and other major sub-contracting jobs are made by the famous New Process Gear Company, Syracuse, N. Y. Their records show that because of their speed and accuracy their new Fellows Gear Production machines have lowered cutting costs by more than half!

For example, the Fellows Heliguide two-spindle hobbing machine at New Process cuts *six times* as many gears per hour as the previous machine. In addition, it saves approximately two hours in set-up time, requires only one operator to watch it because of its easy push-button operation. One man can operate four of these Fellows high-speed Heliguide Hobbing Machines.

New Process gets similar benefits from each of its ten Fellows No. 4GS Gear Shapers. Cutting 30% faster than the old machines, the No. 4GS Gear Shapers also hold to 25% closer tolerance without difficulty, saving on set-up time.

For full information about the complete Precision Line of Fellows Gear Production Equipment, get in touch with your Fellows representative. Write, wire or 'phone any Fellows Office.

THE FELLOWS GEAR SHAPER COMPANY

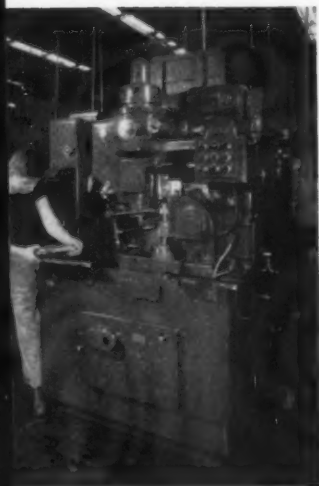
78 River Street, Springfield, Vermont

Branch Offices: 319 Fisher Building, Detroit 2

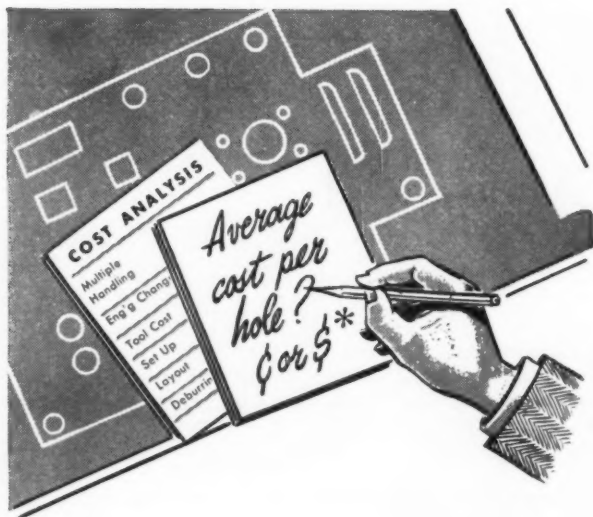
150 West Pleasant Avenue, Maywood, N.J.

5835 West North Avenue, Chicago 39

6214 West Manchester Avenue, Los Angeles 45



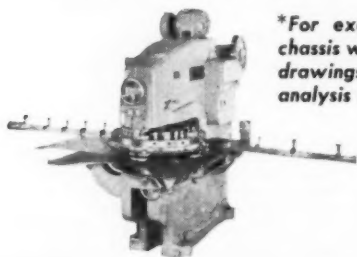
Fellows Gear Production Equipment



How Much Are You Paying for Holes ?

Square holes . . . round holes . . . groups . . . louvers—the shape doesn't matter, but the number of pieces does. Producing holes in sheet metal or plate in small to medium production lots can be an expensive, time consuming job . . . unless you are using a Wiedemann Turret Punch Press.

With a Wiedemann, your short run piercing costs are cut 60% to 90%. The Wiedemann method eliminates both set up and layout—gives you almost unlimited versatility. The Wiedemann turrets carry all the punches and dies you need for a wide variety of jobs. Material is positioned quickly and accurately with a rapid-setting work locating gauge. This amazing Wiedemann method is so flexible that engineering changes can be made on the spot without costly production delays.



**For example, Wiedemann users are selling short run chassis work at 1c per hole. What are your hole costs? Send drawings of your work for a free time study and cost analysis by Wiedemann. Write for Bulletin 101.*

From the small, hand operated R-2 to the 150-ton Turret Punch Press, there's a Wiedemann designed for your short run piercing needs.

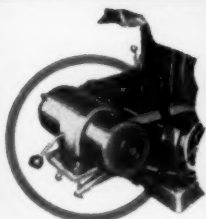
WIEDEMANN MACHINE COMPANY

4265 Wissahickon Ave. P.O. Box 6794 Philadelphia 32, Pa.
Circle No. 272 on Card, Opposite Page 65

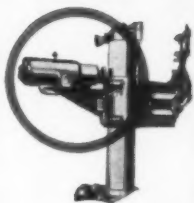
GET

New Performance

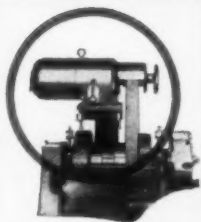
FROM OLD MACHINE TOOLS



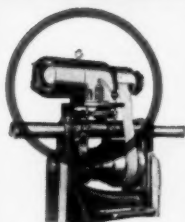
SHAPER



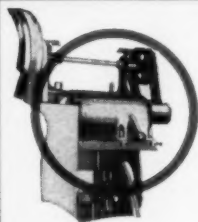
RADIAL DRILL



LATHE



MILLING MACHINE



PLANNER

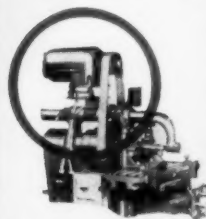


LIMA GEARSHIFT DRIVES

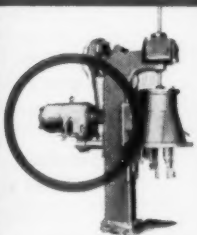
Install modern efficiency in old machine tools—get higher production at lower operating costs!

Lima Gearshift Drives provide outstanding flexibility—available with either four or eight output speeds to assure a correct range of speeds for every job. Full rated horsepower is delivered in all speeds.

Why not let our experienced Sales Engineering Staff show you how easily your machines can be motorized—an accurate survey of your equipment involves no obligation. Write us today for complete information.



MILLING MACHINE



MULTIPLE SPINDLE
DRILL



THE LIMA ELECTRIC MOTOR CO., 252 FINDLAY RD., LIMA, OHIO

Representation throughout the U. S., Canada and abroad

FIRST...FOR DRIVES...MOTORS

AMES



Check Motions or Dimensions In .001" up to 10" Range.

With Ames Long Range Dial Indicator models you can measure in .001", long slide travel, large cams, deep recesses or other dimensions requiring indicator spindle travel of up to 10". Also they have all the advantages built into Ames regular indicators: — large diameter dials, widely spaced dial graduations; movable dials; replaceable contacts, count hands to indicate revolutions of the indicator hand.

Send your problem in long range measuring, Ames will be glad to suggest a solution.

Representatives in principal cities



B.C. AMES CO.

28 Ames Street, Waltham 54, Mass.

MANUFACTURER OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

Circle No. 274 on Card, Opposite Page 65

Low cost—high speed hard-facing with the new METCO THERMOSPRAY process



Hard-facing pump rod with
the Metco Type P ThermoSpray Gun

High spraying speeds—high deposit efficiencies—simplified application

The advantages of applying hard-facing materials in powder form for lower finishing costs have long been known. But slow spraying speeds, low deposit efficiencies and high material costs have hindered their wide application. Now, with the development of the new METCO Type P THERMOSPRAY GUN and the THERMOSPRAY Hard-Facing Alloys, these disadvantages have been overcome.

The THERMOSPRAY GUN is the first ever developed to operate without compressed air—only oxygen and gas (acetylene or hydrogen) are required. The THERMOSPRAY Powders are new, self-fluxing alloys of the nickel-chromium-boron type especially developed to provide dense, corrosion-resistant coatings with hardnesses varying from RC-30 to RC-65, depending on the alloy used. The new Gun applies these materials

faster than any previously available equipment (8 to 10 lbs. per hr.), with deposit efficiencies of over 95%. Depending on requirements, coatings may be fused after spraying, used semi-fused with a newly developed *Metco Process*, or left unfused.

Here is your opportunity to do your own hard-facing at low cost. For further information send off the coupon. No obligation, of course.



**Metallizing
Engineering Co., Inc.**

1115 Prospect Ave., Westbury, L. I., New York

Telephone: EDGEWOOD 4-1300

In Great Britain: Metallizing Equipment Co., Ltd.
Chobham near Woking, England

The following trade names are the property of
Metallizing Engineering Co., Inc.:
METCO®, ThermoSpray *Reg. U. S. Pat. Off.

Don A. Watson
Metallizing Engineering Co., Inc.
1115 Prospect Ave., Westbury, L. I., N. Y.

Please send me more information

- ☐ about the New ThermoSpray Gun
☐ about ThermoSpray Hard-Facing
☐ Please arrange a demonstration in my shop.

name _____

company _____

street _____

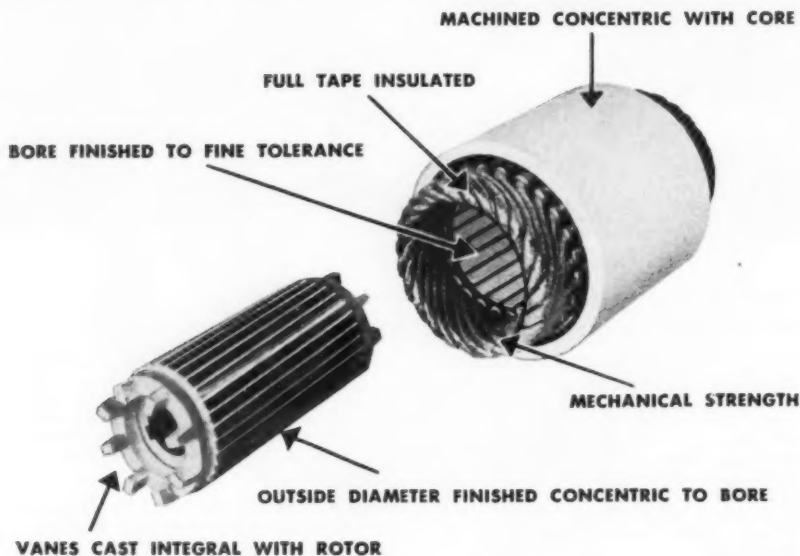
city _____ zone _____ state _____

Circle No. 275 on Card, Opposite Page 65

Serving the Industry Since 1852



WOODS SHAFTLESS MOTORS



The application of direct motor drive with WOODS' Shaftless Motors to high-speed spindles brings the peak of motive efficiency at relatively small cost. Conserves space—eliminates belts and gears—fewer wearing parts. The extensive and varied lines of WOODS' Shaftless Motors are available for nearly every class of direct application.

Let us tell you how you can achieve a reduction in production costs by direct motor drive.

MOTOR DIVISION

S. A. WOODS MACHINE CO.
27th DAMRELL STREET
BOSTON 27, MASS.

Circle No. 276 on Card, Opposite Page 65

Look to Your Machine Mounts to Improve Production

The real key to getting more profit out of your machine tools may be their mounting. That's the job for Unisorb! Here's why . . .

- Increases machine life, less jarring and wearing.
- Machine holds to designed tolerances, and for much longer time.
- Operator efficiency increased, cuts fatigue.
- Makes faster machine speeds practical.
- Greater accuracy results in fewer rejects.

Get the free book to see how Unisorb has paid off for other companies . . . and to find out how you can put Unisorb to work earning profits in your plant.



FE6-5

The name to remember is...

UNISORB

the **FELTERS** company

219 SOUTH STREET, BOSTON 11, MASS.

Manufacturers of Felt and Felt Products

Offices: New York, Philadelphia, Chicago, Detroit, St. Louis

Sales Representative: San Francisco

Mills: Johnson City, New York; Millbury, Mass.; Jackson, Mich.

Representatives in principal cities throughout the world

Send for **FREE "Facts" Booklet**

Name.....Title.....

(Please Print)

Company.....

Street.....

City.....Zone...State.....

Choose the Gage that's RIGHT for YOUR job!

There's a **STANDARD** Dial Snap Gage

That Fits Your Particular Requirements... Precisely

Paralloc®

STANDARD's Paralloc anvil locking mechanism maintains parallelism of anvil faces to an unusually high degree of accuracy

L TYPE ...

For tough, long run jobs or those involving deep, narrow places

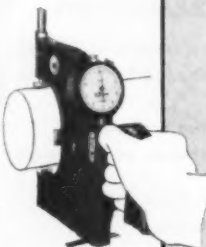
Gages close to shoulders

Flat anvils, faced with tungsten carbide, ideal for close tolerances

Indicator fully guarded, conveniently placed for easy reading

Sizes up to 14"

Wide range of indicators



D TYPE ...

With Paralloc anvil locking mechanism and tungsten carbide faced flat anvils

Lower initial cost

Gages close to shoulders

Suitable for long runs where side clearance and forward position of indicator are not important factors

Sizes up to 8"

Wide range of indicators



Dializers®

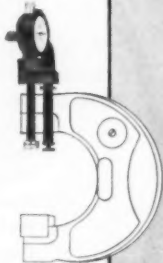
STANDARD Dializers provide an economical, effective means for converting your AGD Adjustable Limit Snap Gages to Dial Snap Gages.

Fit your present AGD frames of any make, or, if desired, we can supply frames up to 26 $\frac{3}{8}$ "

Dializers can be easily installed and transferred from one frame to another

Has radiused contact

The easy way to gain greater efficiency with greater economy



SF SERIES ...

Designed for situations where low cost is an important factor and requirements do not suggest need for Paralloc models.

Light weight, sturdy, special aluminum frame

Fitted with Dializer

One contact radiused

Long range of adjustment

Easily adaptable to many jobs

Sizes to 13 $\frac{1}{2}$ "



Write for details on any or all of these models

STANDARD GAGE COMPANY, INC.

MEASURING INSTRUMENTS FOR PRECISION INDUSTRY

135 PARKER AVE.

POUGHKEEPSIE, N. Y.



Circle No. 278 on Card, Opposite Page 65

FREE!

Page after page shows
the correct abrasive wheel to use
(for the best Blanchard grinding results)



Blanchard wheels in silicate, resinoid and vitrified bonds.



This is our famous booklet *The Art of Blanchard Surface Grinding*—brought up-to-date with a third edition. It contains complete descriptions of our silicate, resinoid and vitrified bonded wheels. It also describes a number of jobs and shows you how to select the correct wheel for each job. Every Blanchard operator should have a copy handy—send for yours today.

Blanchard wheels are guaranteed for uniformity of grade. They're best for Blanchard grinders, best for every job. They give you maximum production, utmost economy . . . whether the work is tough as copper or fragile as glass, whether it requires heavy roughing cuts or precision grinding within .000010" of absolute flatness and surface finish of 1 micro-inch.

PUT IT ON THE **BLANCHARD**

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS.

THE BLANCHARD MACHINE CO.
64 State St., Cambridge 39, Mass.

MTB

Gentlemen:

Please send me a free copy of "The Art of Blanchard Surface Grinding" (3rd Edition).

NAME.....

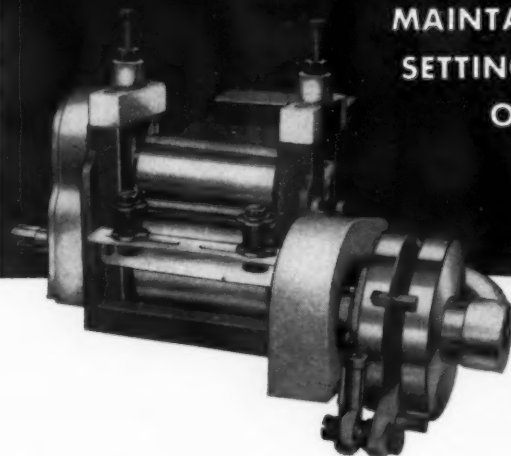
FIRM.....

STREET.....

CITY.....ZONE.....STATE.....

Circle No. 279 on Card, Opposite Page 65

Can You Use AN AUTOMATIC FEED
ON YOUR PRESSES THAT
MAINTAINS ORIGINAL
SETTING REGARDLESS
OF WEAR?



No ratchets or pawls to wear down and "throw off" feed spacing. Feeds in thousandths, reverses instantly, can't slip.

"RFC" AUTOMATIC FEEDS
AVAILABLE TO FIT ALL PRESSES

Write For Literature

**MANUFACTURERS OF QUALITY FEEDS
FOR POWER PRESSES**



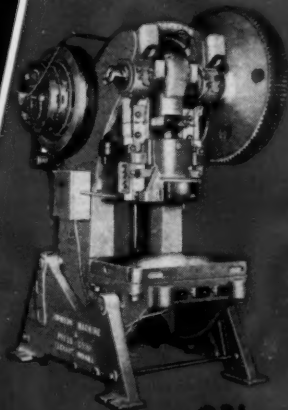
Roll Feeds Corp.

ASHTON, R. I.

Circle No. 280 on Card, Opposite Page 65

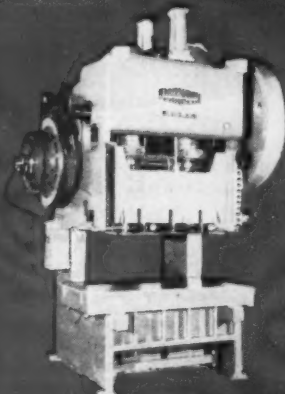
Customers tell us they get
MORE for their money...
that's why they buy these

3 JOHNSON PRESSES



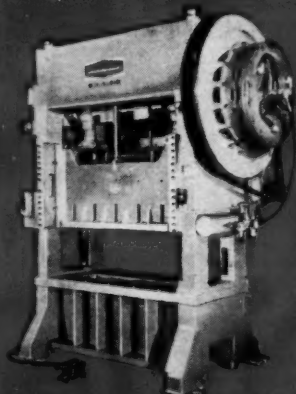
OBI

13 models ranging from 16 to 150 ton capacity in regular, special wide or high speed, toggle pin or air clutch.



GAP DOUBLE-CRANK

40-100-125 and 150 ton capacities, steel fabricated, air clutch, flywheel or geared models.



STRAIGHT SIDE DOUBLE-CRANK

40-60-80-100-125 and 150 ton capacities. Tie rod, steel construction and air clutch.

Write for Bulletin 1956

Johnson

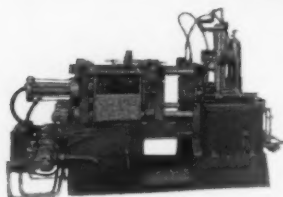
**MACHINE
and PRESS CORP.**

620 WEST INDIANA AVENUE • ELKHART, INDIANA

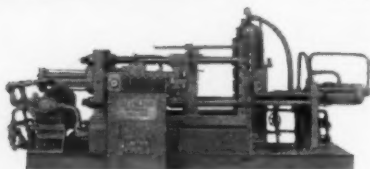
Circle No. 281 on Card, Opposite Page 65

your answer to **Profitable**
die casting production

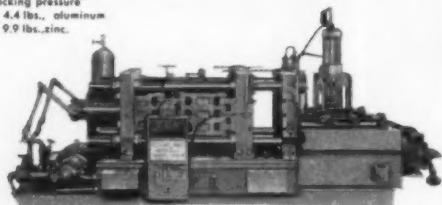
CLEVELANDS



Model 50 Cleveland
50-ton locking pressure*
Capacity: 2.6 lbs., aluminum
5.4 lbs., zinc

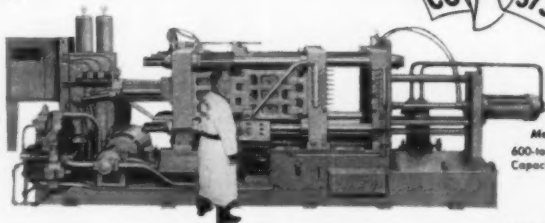


Model 200 Cleveland
200-ton locking pressure*
Capacity: 4.4 lbs., aluminum
9.9 lbs., zinc



Model 400N Cleveland
400-ton locking pressure*
Capacity: 7.2 lbs., aluminum
14.5 lbs., zinc

*Locking pressure
strain gage tested.



Model 400 Cleveland
400-ton locking pressure*
Capacity: 10 lbs., aluminum
25 lbs., zinc

REMEMBER, CLEVELANDS
CUT . . .



THE CLEVELAND AUTOMATIC MACHINE COMPANY

Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

Circle No. 282 on Card, Opposite Page 65

**4934 Beech Street
Cincinnati 12, Ohio**

SALES OFFICES: CHICAGO
CLEVELAND • DETROIT
HARTFORD • S. ORANGE

FEATURES THIS MONTH

MACHINE AND TOOL

blue book

What is a Good Communications Program? An interview with W. F. Rockwell, Jr., president of Rockwell Mfg. Co., discloses the various methods of communications between management and worker and the company and the public. Keystone in their business philosophy is honesty on the part of management and trust on the part of co-workers.

Page 99

A round-up of Washington News discloses that 21 "phantom" contracts totalling \$68.7 million have been issued by the Office of Defense Mobilization. Read also about "Federal Money for Depressed Areas," "Tax Studies" and how "Your Inventive Talent May Solve U.S. Defense Problems."

Page 93

New Idea for Start and End Trimming on Progressive Dies. For a staggered or interlaid blank layout, here's a method of progressive die construction that will eliminate partial blanks from start to end of strip. By Ernest J. Urbas, first prize winner in Machine & Tool Blue Book's 50th Anniversary Production Contest.

Page 109

How to Design Locking Cams. A step-by-step presentation by Alex Arnott dealing with the principle of the wedge in designing locking cams.

Page 117

New applications in ceramic tipped tools utilizing the cutting strength and wear properties are reviewed in an article. The many possible types of tools to which ceramic tips have been affixed and the manufacturers experience with machining different types of metals are discussed.

Page 126

How would you decide these labor problems? 1. The problem of demoting a worker and turning his duties over to a foreman; 2. If you assign a woman to a man's job can you pay her less? 3. If a union officer questions the integrity of management, can you discipline him?

Page 129

Soldering in a controlled atmosphere resulted in an increase in production from 75,000 pieces per year to 1,200,000 pieces.

Page 136

High speed belt grinding of teflon rods permits pre-sizing to meet finish specifications of component parts. Elimination of stock variations also facilitates subsequent screw machine operations.

Page 140

Production quality control charts ascertain the capability and performance of machines and operators at the Warner & Swasey plant.

Page 152

Automatic machining of jet nozzle bits by a new multiple operation index table machine is the first of three machines featured in "News of Automation."

Page 156

QUALITY AT LOW COST

**QUEEN CITY HEAVY DUTY
GRINDERS
DISC GRINDERS
AND BUFFERS**



QUEEN CITY Heavy Duty Disc Grinders and Buffers save you money when you buy and during every hour of use. Ruggedly designed, they feature heavy duty bearings and motors. So good they're offered on a 30-day trial, yet priced 20 to 30% under competing makes.

Choose from the complete range of **QUEEN CITY Grinders and Buffers** . . . floor and bench types . . . in sizes from 1/3 to 10 H.P.

**QUEEN CITY
MACHINE TOOL CO.**

WRITE FOR FREE
CATALOG TODAY!

**QUEEN CITY
MACHINE TOOL CO.**

3912 Kellogg Ave., Cincinnati 26, Ohio

"High Quality—Low Cost—For Over 50 Years"

Circle No. 283 on Card, Opposite Page 65

MEETINGS CONVENTIONS EXHIBITIONS

- Oct. 1-3—**National Electronics Conference**, Hotel Sherman, Chicago, Ill.
- Oct. 1-4—**Metal Mining & Industrial Minerals Convention-Exposition**, Shrine Exposition Hall, Los Angeles, Calif. Congress headquarters—Ring Bldg., Washington 6, D.C.
- Oct. 1-5—**American Institute of Electrical Engineers Fall General Meeting**, Hotel Morrison, Chicago, Ill.
- Oct. 2-6—**Society of Automotive Engineers, Inc. National Aeronautic Meeting, Aircraft Production Forum and Aircraft Engineering Display**, Hotel Statler, Los Angeles, Calif.
- Oct. 6-12—**American Society for Metals. Annual Meeting** on Oct. 10 during National Metal Congress & Exposition, Cleveland Public Auditorium, Cleveland, Ohio.
- Oct. 8-10—**American Society of Mechanical Engineers and American Society of Lubrication Engineers Lubrication Conference**, Chalfonte-Haddon Hall, Atlantic City, N.J.
- Oct. 8-12—**American Welding Society Fall Technical Meeting**, Cleveland Hotel, Cleveland, Ohio, Society headquarters—33 W. 39th St., New York 18, N.Y.
- Oct. 8-12—**38th National Metal Exposition and Congress**, Public Auditorium, Cleveland, Ohio.
- Oct. 8-10—**AIME Institute of Metals, Metals Branch**, Carter Hotel, Cleveland, Ohio.
- Oct. 14-17—**AIME Petroleum Branch**, Biltmore Hotel, Los Angeles, Calif.

MACHINE and TOOL BLUE BOOK

- Oct. 15-16—**American Machine Tool Distributors Association** Annual Meeting. The Broadmoor, Colodaro Springs, Colo. Association headquarters—1900 Arch St., Philadelphia 3, Pa.
- Oct. 18-20—**Foundry Equipment Manufacturers Association** Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters—I Thomas Circle, Washington 5, D.C.
- Oct. 23-26—**National Association of Corrosion Engineers** South Central Region Meeting, Gunter Hotel, San Antonio. Association headquarters—1061 M & M Bldg., Houston 2, Texas.
- Oct. 24-26—**AIME** Fuels Conference, Mining Branch, Sheraton Park Hotel, Washington, D.C.
- Oct. 31—**Anti-Friction Bearing Mfrs. Assn., Inc.** Meeting, Ponte Vedra Inn, Ponte Vedra, Fla. Association headquarters—60 E. 42nd St., New York 17, N.Y.
- Nov. 1-2—**Society of Automotive Engineers, Inc.** National Meeting. The Drake Hotel, Chicago, Ill.
- Nov. 1-4—**National Tool & Die Mfrs. Assn.** Meeting, Hotel Statler, Hartford, Conn. Association headquarters—907 Public Square Bldg., Cleveland 13, Ohio.
- Nov. 7-9—**Steel Founders' Society of America** Technical and Operating Conference, Carter Hotel, Cleveland, Ohio.
- Nov. 8-9—**Society of Automotive Engineers, Inc.,** National Fuels and Lubricants Meeting, The Mayo, Tulsa, Okla.
- Dec. 5-7—**AIME** Electric Furnace Steel Conference, Metals Branch, Hotel Morrison, Chicago, Ill.
- Dec. 10-11—**The Industrial Truck Association** Meeting, Biltmore Hotel, New York, N.Y. Headquarters—900 F. St., N.W., Washington 4, D.C.

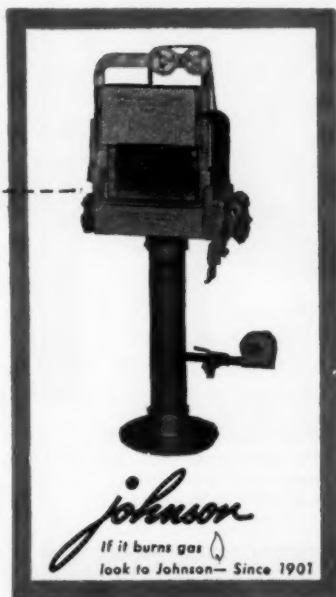
HEATS FAST SAVES TIME

johnson

NUMBER 142 HEAT TREATING FURNACE

Powerful burners in this efficient furnace get heat up to the 1300°-2350° F. range in minutes. Temperatures accurately and quickly regulated. Does fast job with high speed and carbon steels. Ratchet-operated door opens upward. High temperature, refractory-lined firebox is 7" by 13" by 16½". 200,000 BTUs per hour. Carbofrax hearth, G.E. Motor and Johnson Blower included, F.O.B. Factory\$337.00
Write today for free Johnson Catalog

JOHNSON GAS APPLIANCE COMPANY
570 E Avenue NW, Cedar Rapids, Iowa



Circle No. 284 on Card, Opposite Page 65

CINCINNATI
BICKFORD
SUPER SERVICE
Radials

**For faster
metal
drilling...**

This ultra-modern
head... CHARTS and
PRE-SELECTS PROPER
SPEEDS and FEEDS



Built in 4 foot to 8
foot arm, 13 inch to
19 inch column.
Spindle speeds may
be as low as 8 RPM or
as fast as 1750 RPM.

You chart, you control, you speed up operations and have a record for reference with this advanced head. The prescheduling chart plans sequence of operations and is a complete guide for the operator. Instant, quiet, hydraulic selection and changes of 36 speeds and 18 feeds are preselected by two convenient, easily read dials. Controls for clamping of column, arm and head, and arm elevation by power are at the operator's finger tips.

*Write for Bulletin R-33 describing this
ultra-modern tool*

**CINCINNATI
BICKFORD**



RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION

GIDDINGS & LEWIS MACHINE TOOL COMPANY

OAKLEY, CINCINNATI 9, OHIO, U.S.A.

The Shortage of Engineers

No one will deny the existence of a shortage of engineers, nor will few people deny that present engineers can be utilized to better advantage. Whenever a shortage exists, be it in engineering personnel, materials or such a common item as coffee, everyone at once needs twice as much as before. Some of this exists in industry today. Because engineers are hard to come by everyone thinks he must have a dozen at once or go to the wall—he could easily get along with two, but let's have a dozen anyway, one can never tell!

Having talked with many engineers in the past few years we hear many plaintive cries regarding their duties. It boils down to an inefficient or shortsighted use of existing engineering talent. Engineers in many plants spend as much as 30% of their time on duties which could be handled by assistants: The conducting of tests, clerical duties, running back and forth, filing, checking, operating of equipment, etc. If an engineer can determine the process and set the program why should he then spend his valuable time working out speed and feed

details which could be handled by a trained engineering assistant?

Much time is consumed in pure administrative duties. This could be eliminated. If industry made a stringent and sincere attempt to free an engineer's time it would find that the shortage is not serious as the refusal to utilize an engineer's time to fullest advantage. Instead of looking for another engineer to add to the payroll, an engineering assistant could be engaged to untie the hands of their present engineering staff. Sometimes we look for one Chief when two Indians would be just as good.

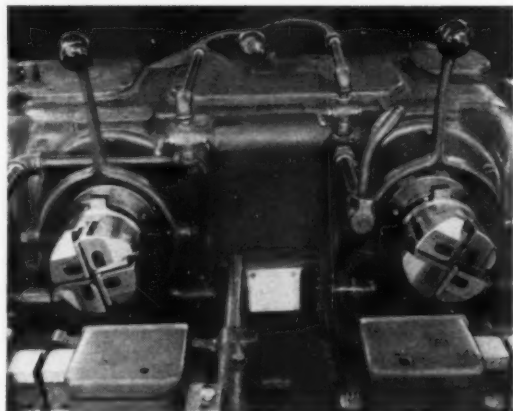
Let's look for a couple of good Indians and let the engineers loose on the jobs for which they were originally hired—pure creative engineering work. Let the assistants handle clerical, administrative, testing and checking duties. Maybe the shortage will not be so acute.

Wm. J. Schleicher

HOLLOW MILLING

Extra LANDIS Feature . . .

LANDIS Die Heads, in addition to conventional threading operations, can be equipped with LANDIS Turning Cutters which will perform turning, grooving, forming, and facing by the hollow milling method. Milling operations may be performed by LANDIS Heads applied to automatic screw machines, turret lathes, or LANDIS leadscrew-type or hydraulic-feed threading machines, and other positive-feed-type machines.



Many Production Advantages

Hollow milling by this method offers an increased efficiency occasioned by the application of a multiple number of cutting tools. The feed rate is thus approximately equal to that of a single tool, multiplied by the number of simultaneously-functioning cutters in the unit—four or six for LANDIS Heads.

The LANDMACO Double Head Leadscrew Threading Machine affords a particularly efficient hollow milling method. One carriage will perform the milling operation while the other carriage is being loaded by the operator, thus allowing consistent continuous production. In addition it is entirely practical to perform milling operations on one spindle and conventional threading operations on the other.

LANDIS Turning Cutters

LANDIS Cutters are economical tools for they are usable for most of their original length. Only the rake angle needs regrinding—a quick and simple procedure. One set of cutters will

machine a wide diametrical range of work, and cutting speeds will range from 30 to 70 linear feet per minute.

Wear and breakage of tools and spoiled work is held to a minimum. The cutting edges of the cutters can be precisely and uniformly located with relation to the center line of the work since they are diametrically-opposed in the cutting position. Thus with cutting strains evenly distributed, the workpiece is never forced out of alignment.

Additional information will be supplied on request—please include specifications.

LANDIS
Machine
COMPANY
WAYNESBORO • PENNSYLVANIA

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

ROUND-UP OF WASHINGTON NEWS

MACHINE AND TOOL

blue book

Special Meetings for Small Business Men. Government and Industry men are scheduling meetings in some twenty cities for the purpose of giving the small business man the how and where to get contracts or subcontracts as well as loans. Query your regional director of the Small Business Administration to find out if your city is on the list. If your city, or a nearby city, is not on the agenda, it might pay your trade group to team up with other local trade groups to solicit S.B.A. to include your city on its tour. Reason: Many prime contracts or subcontracts are let late in the year.

21 "Phantom" Contracts Total \$68.7 Million

The Office of Defense Mobilization has issued 21 orders for general purpose machine tools to be made if mobilization is declared. These "phantom" orders, while totaling \$68.7 million, mean that no payments will be made and no production started unless a state of mobilization is reached. In this way the government is assured of immediate production of tools in an emergency.

Within the next few months, 63 more of these "stand by" contracts are expected to be awarded to companies participating in the program. Total value of these contracts will up the figure to \$250 million.

A fund of \$21 million has been set aside to provide advances to the

machine tool manufacturers. These advances amount to about 30 per cent of the value of the contracts.

Federal Money for Depressed Areas

What happened to the bill designed to put tax money into those areas with chronic unemployment? Here's a summary of the events which give an inkling how some of our Congressmen can bring on a case of hyper-inflation:

The Administration introduced a bill for a new program to alleviate conditions in these depressed areas. The bill provided for \$50 million in federal money. The Democrats, however, had a bill with a price tag of \$200 million.

After the Senate Labor Committee held hearings on the bill, the price was raised to \$300 million.

When the bill reached the Senate floor some 60 Senators liked the idea of a \$325 million price tag. That's the figure they bought. The House, as you know, did not pass the precedent-shattering bill, which is probably what the senators anticipated all along.

Tax Studies

The Joint Committee of Internal Revenue Taxation will undertake a study to bring about more constructive tax and revenue legislation. Senator Byrd (D. Va.) is chairman of the committee. Under the direction of Colin Stam, the study will explore these problems:

1. Effect on small business of income and estate tax rules, with suggestions for relief.

2. Tax loopholes which should be closed.

3. A satisfactory method for taxing income of life insurance companies.

4. Operation of the program for

fast amortization of emergency facilities and the need for its continuance.

5. The net loss carryover provisions, their simplification and removal of inequities.

6. The present law's treatment of annuities and its simplification.

7. Income tax treatment of physically handicapped and totally disabled persons.

8. Errors or inequities in the 1954 Code needing correction.

9. Individual income tax return forms, with suggestions for simplification.

10. Income tax treatment of prepaid income and reserves for estimated expenses.

11. Taxation of corporations and individuals doing business abroad, with particular reference to Western Hemisphere corporations.

12. Present priority of federal tax liens, in view of recent U. S. Supreme Court decisions relating to mechanic liens.

Harnessing Vibration. Loctite, a liquid lock nut that hardens overnight and does away with washers, is a new product put out by a Hartford, Conn. plant. This plastic with a petroleum base comes in various strengths. It is said the toughest will withstand temperatures of 350 degrees. One report has it that the metal parts will break before the nuts can be removed. The solution joins metal surfaces together, including aluminum and glass. While loctite should have widespread application in many fields, so far it is being used only in the aircraft, automobile and railroad industries.

Cut DIE COST...



...BEFORE it gets to the toolroom

Nothing makes a diemaker meaner than a sticky punch holder. Count the times he removes it building up a die and it's foolish to save a few dollars buying second-rate die sets.

That can't happen with Detroit Die Sets because we are constantly working to improve our die sets. Recently developed ball bushings are an example. Extensive testing, in our own and customers' plants, has proven their value. Now, they're available on Detroit Die Sets to extend production runs and make a diemaker's job easier.

Details on the use of ball bushings plus other helpful information on cost-cutting Detroit Die Sets are available upon request. Write today, or see your local representative—he's as near as your phone.

Offices
in Principal
Industrial Centers

2895 WEST GRAND BLVD.
DETROIT 2, MICHIGAN

Detroit
DIE SET
CORPORATION

13. Reducing inequities in present excise tax rates.

14. Income tax treatment of capital gains and losses.

Your Inventive Talent May Solve U.S. Defense Problems

If you are an inventor, professional or amateur, you may have the germ of an idea in the back of your mind which could be the solution to one of the technical problems currently affecting national defense, according to the National Inventors Council, U. S. Department of Commerce.

Many of the nation's civilian inventors have contributed their brain-power toward solution of problems for the Armed Forces and have conceived ideas which have saved many lives and dollars. Over 200 of these successful inventions

have been channeled through the National Inventors Council, which since 1940 has served as liaison agency between inventors and the military services.

The Council publishes a cumulative list of technical problems turned over to it by the military agencies, the problems ranging through the fields of aeronautics, electronics, mechanics, plastics, chemistry, instrumentation, materials handling, metallurgy, and others. An inventor who has a proposed solution to one of these problems can submit his idea to the Council which will evaluate it and, if it is practicable, present it to the proper military agency, eliminating any red tape along the way.

To obtain a copy of the current "Technical Problems Affecting National Defense", write to NIC, U. S. Department of Commerce, Washington 25, D.C.

Shipments of Cutting Type Machine Tools in July amounted to \$65,350,000 as compared to \$76,250,000 in June. This decline in July reflects the seasonal vacations in the Machine Tool Industry. Net new orders of \$62,100,000 increased slightly in July as compared to \$61,850,000 in June—the National Machine Tool Builders' Association reports.

Rail and Trucking Freight Rates. With the loss of revenue during the steel strike and lower net incomes this year, formal request for a rail increase of 5% to 10% will be made shortly by most of the eastern railroads. The C & O and Virginian are not involved. Southern and western roads are not enthusiastic about joining in the bid. Highway haulers feel that this move by the railroads will make it easier for them to raise rates now, possibly more than 6% granted this spring.

MEMO:

TO: Purchasing
FROM: Production Engineering

Tom —

With a little outside help,
I think we could ream and bore
those castings in one operation —
with gun drills.

Would you get a Chicago
Latrobe engineer in for
consultation? I hear they are best
in that field. E.T.

Much is new with gun drills. They are being used today on a variety of applications unheard of a short while ago. So much has happened — so fast — that it has been difficult for many of the most expert technicians to keep fully informed. A good

place to get sound advice on the use of gun drills in any plant is from a Chicago-Latrobe service-engineer. They are pioneers both in production of finer tools and in development of techniques for their use. Call C-L soon... without obligation, of course.

CHICAGO-LATROBE

CARBIDE TIPPED GUN DRILLS



Part of the Chicago-Latrobe COMPLETE line... available through service-minded Industrial Distributors.

CHICAGO-LATROBE

418 W. ONTARIO ST., CHICAGO 10, ILLINOIS

DRILLS • REAMERS • COUNTERSINKS • COUNTERBORES • SPECIAL TOOLS

Circle No. 288 on Card, Opposite Page 65



Ask for Circular 200

Every day... *Everywhere*... Your Competitors are using

DEVLIEG
Spiramatic
JIGMILS®

for
**ULTRA-PRECISION
BORING and MILLING**



THE "ACCEPTED" MACHINE FOR JIGLESS PRODUCTION OR ONE-PIECE JOBS

The Devlieg System of "JIGLESS BORING" — ★ Eliminates expensive jigs ★ Permits complete flexibility of product design ★ Insures interchangeable assembly of parts without hand fitting.

Devlieg JIGMILS are widely used in toolrooms and experimental shops for machining all types of jigs, fixtures and experimental parts to precise limits of accuracy with a minimum of operator skill.

Come to Detroit

SEE A PRACTICAL
DEMONSTRATION OF THE
JIGMIL TECHNIQUE

DEVLIEG MACHINE COMPANY

Write for Illustrated Catalog

450 Fair Avenue • Ferndale
DETROIT 20, MICHIGAN

Circle No. 289 on Card, Opposite Page 63

LEADERS OF THOUGHT IN INDUSTRY

MACHINE AND TOOL

blue book

What is a Good Communications Program?



The system at Rockwell Mfg. Co. reflects good employee and public relations. Says President W. F. Rockwell, Jr.: "We give employees, customers, suppliers ALL the information."

Q. Before we discuss your communications system may we learn about your underlying business philosophy?

A. Our business philosophy is summed up in one sentence: Everyone working together for the common good.

Q. And to achieve this end?

A. I'm in no position to say where

we'd be if we had no communications program. I do think we're on the right road; our company is prospering, the management of the various plants work together; we have the respect of our employees, our stockholders and our customers. Everyone appears to be working for the good of all, which eventually results in good for himself.

Communications Program

continued

Q. It would appear that trust is an important keystone in your business philosophy?

A. You can't be too successful in this world without honesty on the part of management and trust on the part of the co-workers.

Q. How do you project this honesty?

A. By being honest at all times. By discussing our affairs in the open forum. One would think this would invite criticism of policies, but this is not true. We find instead a willingness to help, a willingness to think in terms of the larger operation, a willingness to correct that which is wrong, or inefficient. By opening all the windows we allow

a great deal of fresh air to clean our house and dissipate the mustiness which collects in dark corners.

Q. To transmit your ideas of honesty and open discussion brings us now to the "How" of doing this; the methods of communications.

A. We use the written and the spoken word. Among the letters we have: 1. A President's Letter circulating to all the management heads of our plants; 2. A Management Letter for all our supervisors.

Q. How often are these published?

A. The President's Letter is monthly, the Management Letter is quarterly.

Willard F. Rockwell, Jr.

Willard F. Rockwell, Jr., a graduate industrial engineer, has been a director of Rockwell Manufacturing Company, Pittsburgh, since March 26, 1940, and president of the company since February, 1947. He was vice-president and controller from 1939 until his entry into the United States Army in 1943. Following his placement on the inactive list with the rank of Captain in 1945, he returned to Rockwell Manufacturing Company as vice-president and general manager, a position he held until his election as president.

Mr. Rockwell is president (and

a director) of the Gas Appliance Manufacturers Association—an organization made up of officials of 600 firms manufacturing gas appliances and equipment. He is also a director of the American Gas Association.

After graduating from Pennsylvania State University in 1935, Mr. Rockwell was employed by Pittsburgh Equitable Meter Company (a company which later became Rockwell Manufacturing Company). In 1936-37 he was employed by Timken-Detroit Axle Company, Detroit. He returned to Pittsburgh Equitable Meter Company in 1938.

Q. What does the President's Letter contain?

A. Our plans for expansion. Our budgets for the coming quarter; the sales expected during the quarter; inventories; sales and profits of the previous quarter; news and information of team accomplishments; new faces; our labor situation; in general, a frank discussion of our business as seen from headquarters.

Q. What does the Management Letter discuss?

A. It touches on sales and shipments, costs, budgets and similar financial matters. It also discusses the various plant safety records, industrial relations, construction, new plants, new products, names in the news, activities of all the plants, new ideas.

Q. Do you discuss the financial matters of every plant in these letters?

A. Yes. Every plant is discussed. In this way everyone knows what's going on everywhere else.

Q. If one plant slips in its sales or output it is made known to everyone else?

A. That's right.

Q. Doesn't that result in rivalry and hard feelings?

A. No! On the contrary, it promotes better business management. No one wants to be on the bottom or let his colleagues in other plants know he's not holding up his end.



Q. *The Management Letter discusses also the many problems peculiar to the operating personnel of your plant, or the supervisors?*

A. Yes. Their problems are specific. Their interest is not primarily in the financial aspect as much as it is in the solution of how to do a better job in safety, industrial relations, production, purchasing and the many jobs that are needed to operate a business.

Q. *Do you exchange ideas?*

A. Yes. The management of each plant also issues a Management Letter which is distributed to the supervisors and sales force of that plant. This naturally deals with the problems at hand as they relate to that particular industry. It is more detailed and discusses such things as absenteeism, fire control, labor problems, specific production problems, etc.

These Management Letters are sent to the home office and all worthwhile ideas are copied and transmitted to the other plants, through a publication known as Direct Line.

Q. *How do the plants handle communications with the workers?*

A. Through meetings, personal contact and individual house organs. We have found that employees are

interested in their company and we give them all the information we think they want. In addition, there are meetings of the various committees in each plant: Safety, production, labor, etc. There are clubs, bowling teams, softball teams and all the other phases of plant activity which enable the supervisory force and the workers to get together. Common problems are always aired. No employee need feel he's left out or is left in the dark regarding company policy and plans.

Q. *Then an employee can get any information he wants regarding company standing, even financial by asking for it?*

A. If he wants the information, yes. We have nothing to hide from anyone.

Q. *A little while ago you mentioned weekly meetings.*

A. Each Friday afternoon at 3 PM a management meeting is held here in Pittsburgh which all local management personnel attends. Our policies, plans, budgets, sales, etc. are discussed. Each plant also has regular meetings for the same purpose. Through the President's Letter and the Management Letter and the various letters of the individual plants, useful information is culled and distributed.

Q. How long are these Letters?

A. The President's Letter is about seven pages long, the Management Letter runs around 11 pages.

Q. What other media do you use in your communications program?

A. We use paid advertising space in magazines. These advertisements are in the form of a message from the president discussing business in general, Rockwell business in particular and tries to reach the stockholders and the general public, keeping them abreast month to month of our plans, new products, etc. In addition, advertising space is used by the various division heads to tell of their operations in their respective communities.

A healthy community climate is essential to successful business management, hence these local messages. In addition, our management team and our workers are urged to participate in community activities and to support worthwhile local endeavors.

Q. I'm sure many business men will share your views. Have we neglected any phases of your communications program?

A. Yes. Several important phases. We also have a number of technical publications for our various product lines. While they're really external house organs circulating to our customers we try to go beyond the usual product plugging material and present articles and hints on more efficient methods—in other



L. A. DIXON, executive vice-president, confers with Mr. Rockwell about a phase of the communications program.

words, we try to help our customer first, realizing that if we help the customer and serve him unselfishly and honestly and give him a good product we need not fear for his business.

Q. Do you have any top management meetings?

A. I should like to mention our Annual Management Meeting. About 75 members of our top management people gather for a three day meeting each year in February. The first day reviews the past year and the last two days are devoted to the future. Our plant managers and sales managers go back to the field armed with facts, which they in turn are asked to disseminate to their co-workers at their discretion.

• • •

LETTERS TO THE EDITOR

MACHINE AND TOOL

blue book

I read your Editorial—It's Good Business to Knock Business—with considerable interest. I can remember the time when business men refused to give the workers a fair share of the profits. The employee could not criticize or suggest without fear of reprisal. Business was generally organized against any and all attempts to secure better wages, shorter hours and improved working conditions.

Soon there was organization of another sort. Workers banded together as a union to increase wages, shorten hours, and improve working conditions. We had a period of unrest, including sitdown strikes and many acts of violence. Our government had passed laws favoring labor. Labor had the advantage and abused it. It was not a healthy condition and city, state and government took steps to prevent violence. Wiser men stepped in and got rid of the radicals.

The Taft Hartley law was passed and since that time our country has enjoyed a more peaceful settlement of grievances. This law, contrary to union opinion, does not favor either side. Labor has made continuous gains since its adoption.

From time to time we find some politicians who paint business as a monster. The public is no longer fooled with such political maneuvers. It seems to me some of these cheap politicians will do anything to get votes. We also find many organizations who knock big business. Big business was once a small business. They got big by the manufacture of a product that the public could use at a price they could afford to pay. If big business did not supply a quality product and good service it would never become big.

A. E. Salmons
30 Church Road
Norristown, Pennsylvania

BLUE BOOK to Argentina

Would you please send me the book titled "Announcing Blue Book Winners", and monthly the MACHINE and TOOL BLUE BOOK which is a very interesting and complete publication.

ALDO MORELLI CIA
Ayolas 168F
Rosario, Argentina

Letter referred to our Circulation Department.

Deep Hole Drilling

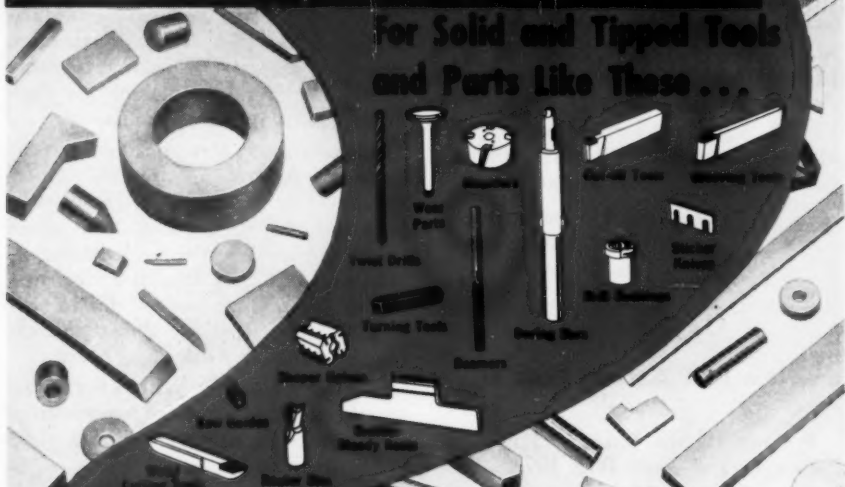
I would like to request six (6) copies, tear sheets, of the article "Deep Hole Drilling at Douglas Aircraft" in the June issue of Machine & Tool Blue Book. . . .

E. F. LAUMANN, PRESIDENT
LAHR MACHINE & TOOL CORP.
Toledo, Ohio

Glad to co-operate—tear sheets on their way.

Use V-R Quality Carbides

For Solid and Tipped Tools
and Parts Like These...



• **Standards.** Vascoloy-Ramet manufactures and stocks standard cemented carbide blanks for solid and tipped cutting tools... wear parts... punches... dies... gages... bushings... guides... mandrels... lathe centers... chisels... router bits... end mills... and hundreds of other items.

Specials. V-R produces custom made carbide blanks for flat and circular form tools and all special cutting tools and wear parts.

Grades. V-R standard grades of cemented carbides will fit most applications.

Quality. V-R advanced manufacturing and control procedures assure you of consistent uniformity of product.

ASK FOR CATALOG—complete dimensional and price data on hundreds of stock blanks and cutting tools. Call your local V-R Representative or Distributor... or write:

C-5885

... and hundreds of
other tools and parts

Since 1930 Leader
in the Manufacture
of Quality Carbides



Vascoloy-Ramet Corporation

SUBSIDIARY OF FANSTEEL METALLURGICAL CORPORATION

850 Market Street, Waukegan, Illinois

Circle No. 290 on Card, Opposite Page 65

New Cutting Tool

We would appreciate receiving three (3) copies of the article entitled "Faster, less expensive cutting tool passes first hurdle," Vol. 50 No. 12, December 1955 pages 110-112. Please send them to Pratt & Whitney Aircraft, Division of United Aircraft, Queen Street, Southington, Connecticut. Thank you for your attention to this matter.

GERALD H. DOHERTY,
TOOL DESIGNER,
PRATT & WHITNEY
Southington, Connecticut

American Built Machine Tools to Texas

We note in the June, 1953 issue of "Machine and Tool Blue Book" that Volume One of machine tool reports was available at \$3.00 per copy.

L. L. BLAGG, SUPERVISOR,
INDUSTRIAL ENGINEERING
TEMCO AIRCRAFT CORPORATION
Dallas 2, Texas

Volume I and Volume II of "American-Built Machine Tools" are now available for the reduced price of \$6.00 for the set. Volume I sells for \$3.00 and Volume II has recently been reduced from \$4.50 to \$3.50.

Cheers For Robert E. Wilson

I can't tell you how pleased I was to read the interview with Robert E. Wilson, Chairman of the Board, Standard Oil Co., Indiana. There is so much emphasis today on technical and business education that we are slowly educating people to have trained brains like machines. We are not developing educated, civilized human beings, we

are manufacturing trained robots on a mass production basis.

The progress of the world has come from people who had broad training in humanities first and specialization secondly. We are neglecting to build civilized, cultural people for the fleeting advantage of a specialist.

Ideas, broad thoughts, concepts—these are the tools of progress. Unfortunately, we are not developing our boys and girls to think, to have broad concepts, instead we're developing slide-rule minds who may know the first law of thermodynamics but don't know a thing about Plato, Beethoven, Moses, Goethe, Mills, Whistler and Marx.

My hat off to Mr. Wilson for stressing the need of training our youth in the humanities, in the arts and in plain good, civilized living.

JOHN SYLVESTER DE PRIOMOSO
New York City

Hitchcock's 1957 Directory

Many trade magazines and journals publish a directory annually or separately in a monthly edition. This directory lists manufacturers under product classification for items the subscribers and readers purchase.

We manufacture a number of items that your readers would be interested in. If you have such a listing, we would very much like to have our name shown. . . .

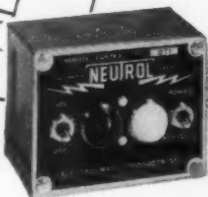
GEORGE W. NOLD, ASS'T. SALES MGR.
WATTS REGULATOR COMPANY
Lawrence, Mass.

We shall be delighted to publish your products in our 1957 MACHINE and TOOL DIRECTORY. This directory is referred to by the entire metalworking industry throughout the year and it is one of the most complete indexes of metalworking equipment and supplies.

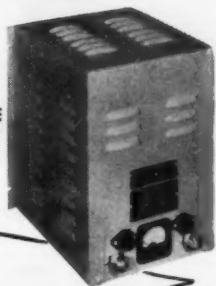
electrical controls for Full Magnetic Chuck performance



A
ELIMINATE
STRONG ARM
METHODS



B
DEPENDABLE SOURCE
OF DIRECT CURRENT



C
PARALLEL
GRINDING
WITHOUT
SHIMMING



A **ELECTRO-MAGNETIC
CHUCK CONTROL**

Releases and demagnetizes work pieces simultaneously. No time lost. No damage to work or chuck face. Protects chuck from voltage surges. Speeds production. Chuck capacities: 50 to 15,000 Watts . . . 60 to 20,000 square inch chuck area.

B **ELECTRO-MATIC RECTIFIER**

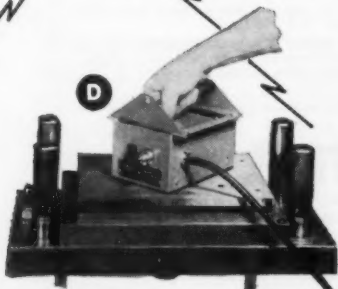
Power conversion Unit, proved for dependable use with Magnetic chucks and other direct current equipment, from 50 Watts to 40 Kilowatts.

C **NEUTROLATOR HOLDING POWER
REGULATOR AND CHUCK CONTROL**

Provides regulation of holding power which permits grinding without shimming, to closer parallelism than ever before possible. In production grinding where holding power must be the same with each work piece, Neutrolator reproduces the same tension on successive pieces without readjustment. Where various tensions are required, a simple dial or push-button control provides regulation of holding power.

D **ELECTRO-MATIC A.C. DEMAGNETIZER**

Demagnetizes dies, punches, cutters, tools that have been magnetized from any source. Works by simple contact. Operates on standard A.C. voltage. Will not overheat through constant use. A size for every purpose.



*The Best Is None Too Good For
Your Cutting Tools And Dies*

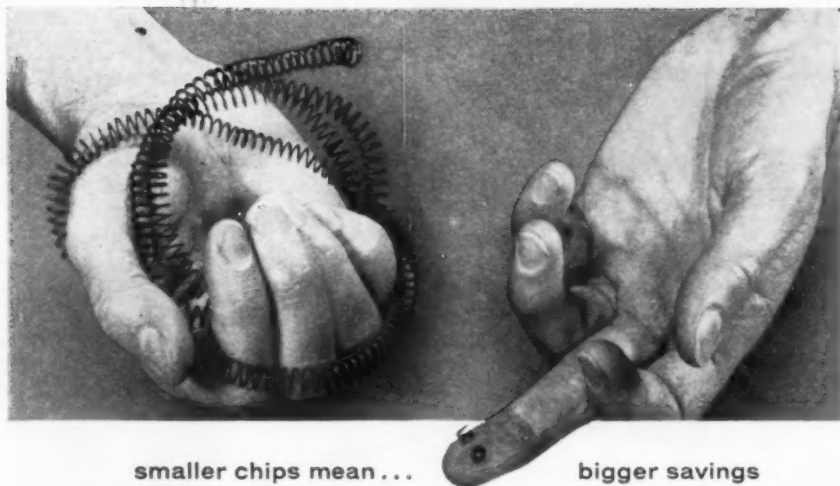
Circle No. 291 on Card, Opposite Page 65

**ELECTRO-MATIC
PRODUCTS
CO.**

2235-37 N. Knox Ave.

Chicago 39, Ill. (U.S.A.)

Telephone: BElmont 5-4010



Cut costs with RYCUT steels!

Three new Ryerson leaded alloys

These short, fast-breaking chips have real meaning to cost-conscious purchasing and production men. In an ever-increasing number of shops, small chips like these mean that the switch has been made to Rycut steels. They mean that tools are turning faster—that production is up as much as 200%.

The secret of Rycut's machining speed is a minute quantity of lead, finely dispersed throughout the steel. This acts as a lubricant between tool and steel. The results are revolutionizing machine shop practice:

- Up to 200% more parts can be produced per machine hour!
- Tool life is lengthened as much as 300%!
- Finish is improved!

There's a Rycut leaded alloy for every application. Use RYCUT 20 when you need a

carburizing alloy; RYCUT 40 for .40 carbon alloy applications; and RYCUT 50 for .50 carbon alloy uses. Every one is a cost-cutter.

Figure how much this increased production and longer tool life would lower costs in YOUR shop—and raise your profits! Call your nearby Ryerson plant today . . . large stocks assure you of quick shipment.

LEADED PLATE VS. MILD STEEL A MACHINING DEMONSTRATION BOOTH 405 METAL SHOW

The remarkable machinability of our New E-Z Cut leaded plate steel will be demonstrated at the National Metal Show in Cleveland. Don't miss it.

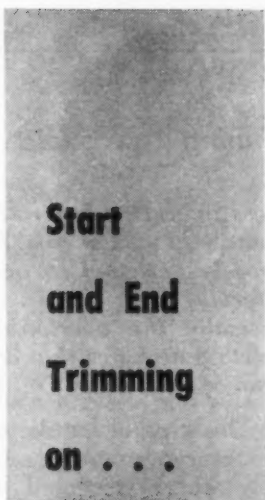
Flame cutting also demonstrated—Watch the actual burning of intricate steel shapes with electric eye equipment.

RYERSON STEEL

In stock: Bars, structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing bars, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Circle No. 292 on Card, Opposite Page 65



Progressive Dies



By **Ernest J. Urbas**
Supt., Tool & Die Dept.
The Guarantee Specialty Mfg. Co.
Cleveland, Ohio.

For staggered or interlaid blank layout, here's a method of progressive die construction that will eliminate partial blanks from start to end of strip

● The other day I heard a television announcer extolling the virtues of a cereal food, in particular he was emphasizing the fact that it contained "Farfal". What in the world is "Farfal"? The dictionary defined it as: the husk or shell of oats: the waste of oats after the cleaning operation. The announcer

was telling us that his product contained something it was not supposed to contain. It seems that every thing that is being sold nowadays contains some mysterious ingredient.

We custom stampers fall in the same category as the announcer when we talk of producing stamp-

Start and end trimming can avoid a ruined

ings at the fantastic speeds of 400—500—1000 hits per minute. We know the truth runs something like this—1000 hits per minute, then ten days in the die maintenance department. The point is that it is of little importance how many hits are made per minute. In quantity stamping the important figure is the quantity produced per day, more important is the quantity produced in a week and still more important, the quantity produced in a month.

The trick of being able to produce fantastic quantities in a day or week or month is to keep the tools in perpetual service; *i.e.*, keep the die in the press in actual production with little or no servicing such as repairs or premature grinding.

Many stampers have suffered a sad experience with progressive dies mainly due to continual punch breakage, sheared dies and short die life because of excessive grinding. These shortcomings are a common problem shared by all die shops and metal stampers. The cause is the continual abuse the punches and dies receive from miscuts and partial blanks.

The partial blanks and miscuts are not the result of care-

less operation but rather the intentional partial cuts, Fig. 1, purposely designed to occur at the start of every strip . . . and especially the overlooked incomplete punchings that occur at the end of each strip, Fig. 2.

This type of mutilation is prone to occur in progressive dies, especially where staggered blanks and interlaid patterns, Fig. 2, are employed to conserve material.

You can readily observe that when the material that is intended to be processed through the die comes in large coils, or in exceptionally long strip lengths, the discarding of the tail end of the strip is warranted to insure continuous operation. However, this solution takes care of the tail end of the strip but the miscuts at the start of the strip would still occur. Moreover, all progressive dies do not use coil material; actually more blanking dies use short strip lengths sheared from a sheet.

In these cases if discarding the end of the strip is practised to prevent punch and die breakage, the value of the material tossed away might be considerable. This loss may be too exorbitant to prevail in competitive stamping.

I wish to offer a method of pro-

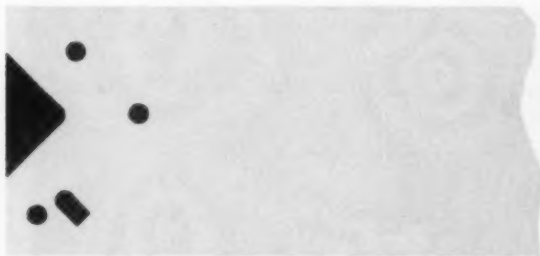
die from clashing of punches against die edges

gressive die construction whenever a staggered or interlaid blank layout is to be employed, Fig. 11. This method will completely eliminate the possibility of partial blanks both from the start of the strip and also from the tail end of the strip. Every blank will be complete, the complete strip of material will be processed through the die, regardless of the type of layout used to conserve material.

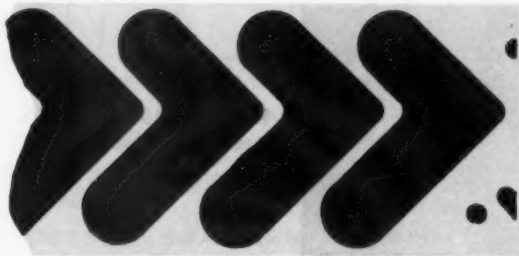
With this method of construction the die will operate contin-

uously, the punches can't be broken by partial cuts and the die can't be sheared by partial cuts of the blanking punch.

In this type of construction the die is provided with a trim unit in the starting end of the die. The material is trimmed at the start of the strip, Fig. 3, which cuts an outline that matches in the normal scrap area between blanks. As the strip is progressed through the die, various stations of the die, Fig. 4 and 5, no harm can befall any of



1. START OF STRIP showing first hit partial blank and complete pierce. Incomplete blank will deflect punch.



2. LAST BLANK at end of strip, showing deflection of piercing punches.

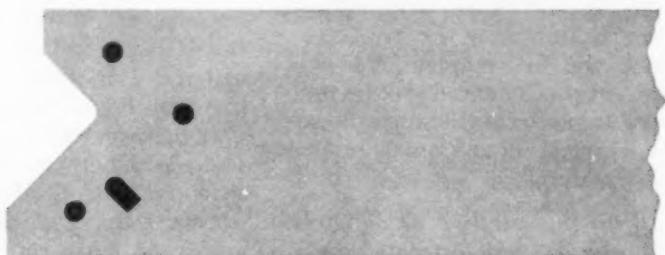
Progressive Dies

continued

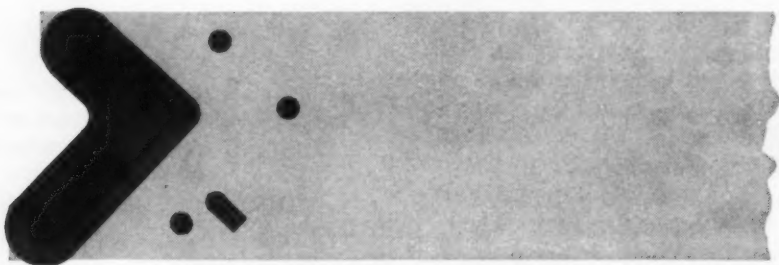
the punches because the vulnerable material has been cut away. When the end of the strip approaches the die, Fig. 6, again the strip is trimmed and the strip is processed through the die, Fig. 7.



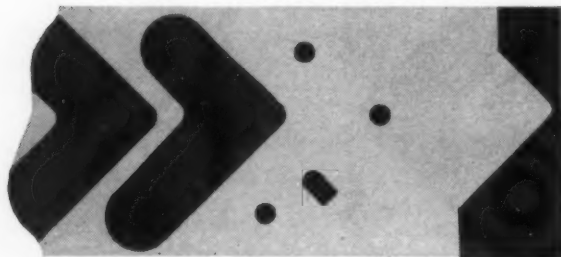
3. TRIM PUNCH lowered at the start of strip.



4. TRIM PUNCH ELEVATED, showing pierce operation.



5. SHOWING BLANK AND PIERCE OPERATIONS with trim punch elevated.

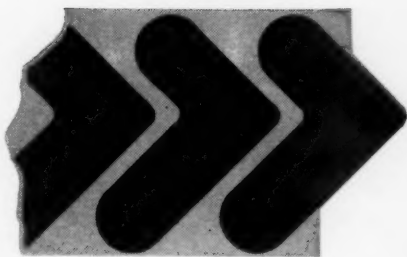


6. TRIM PUNCH LOWERED showing trim at end of strip.

This trim performance is possible by a simple sliding mechanism, Fig. 12, which lowers the punch so that it can trim the material. Whenever you desire move the sliding mechanism to its original position; this will permit the trim punch to elevate, Fig. 13, so that it can't cut the material.

You can appreciate that the lowering and elevating of the trim punch is required only when the trim is necessary, i.e., at the beginning of the strip and at the end of the strip. During the running of the strip the trim punch is elevated.

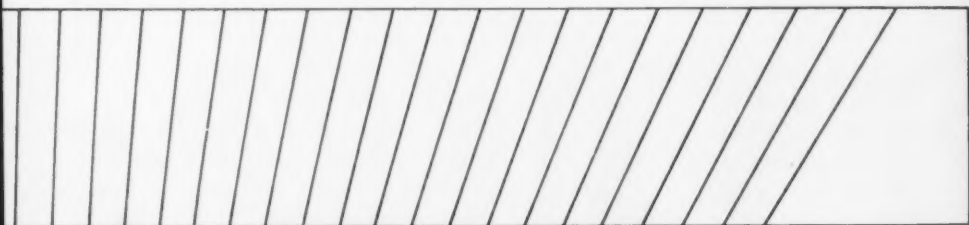
Sometimes attempts are made to cut the strips in precise multiple lengths to avoid the making of partial blanks. This usually proves to be of little help for the allowable tolerance of pilot fit accumulates and the end piece can be a partial blank. The additional labor spent on shearing to multiple lengths



7. STRIP COMPLETED.

shoots up the cost of the job and reduces the potential of the shear capacity. Start and end trimmings can avoid this.

You may have noticed that when a die designer makes a drawing of a die layout that he positions the finger stops (the method generally employed to start a strip through a die) on the assumption that the material will be sheared with a square starting edge. How wrong can he be? The shear operator is permitted a tolerance of $1/32$ vari-



8. SHOWING ACCUMULATION OF SHEAR ALLOWANCE as strips are sheared.

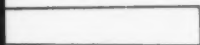


FIGURE 9

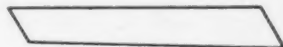
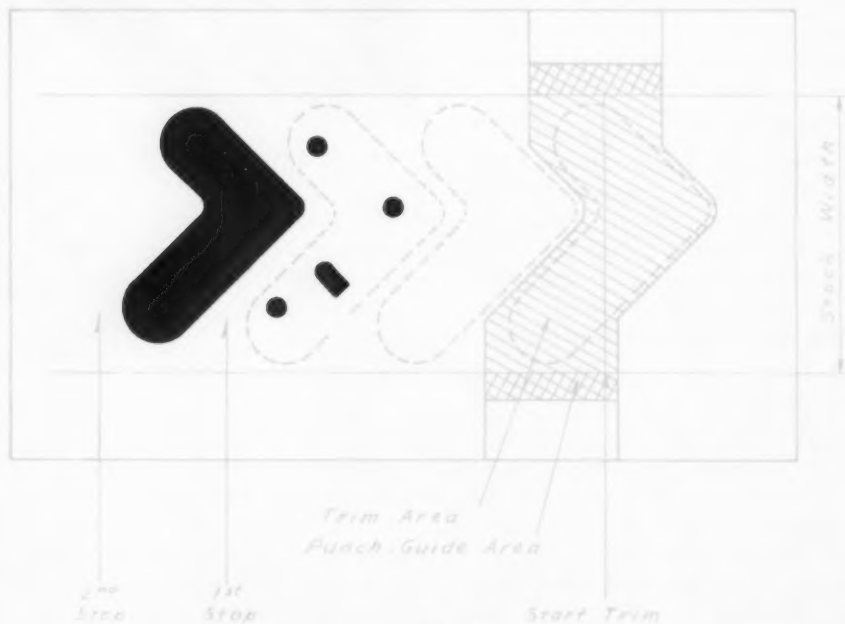


FIGURE 10

FIGURES 9 and 10 show difference in the starting end of strips due to accumulation of shearing allowance.



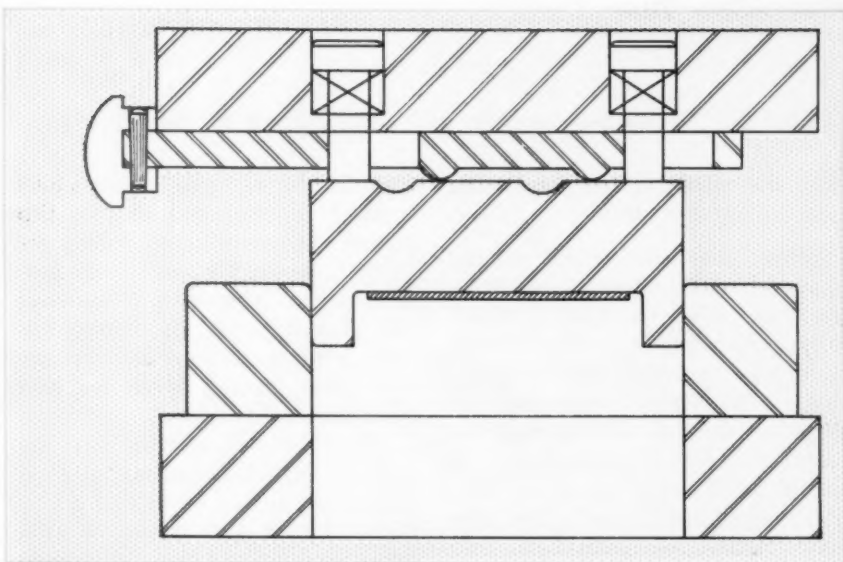
11. PLAN OF DIE.

ance in width; i.e., the width on one end can be $1/32$ wider than the other. The shear, being equipped with a butt gage stop, permits the duplication of each cut. However, for every cut that is made on a sheet, Fig. 8, the angle increases on the ends of the strip, Fig. 9 and 10. Literally, the sheet is being cut like a fan, Fig. 8. If this be the case the starting end of the strip is apt to lie over a partial

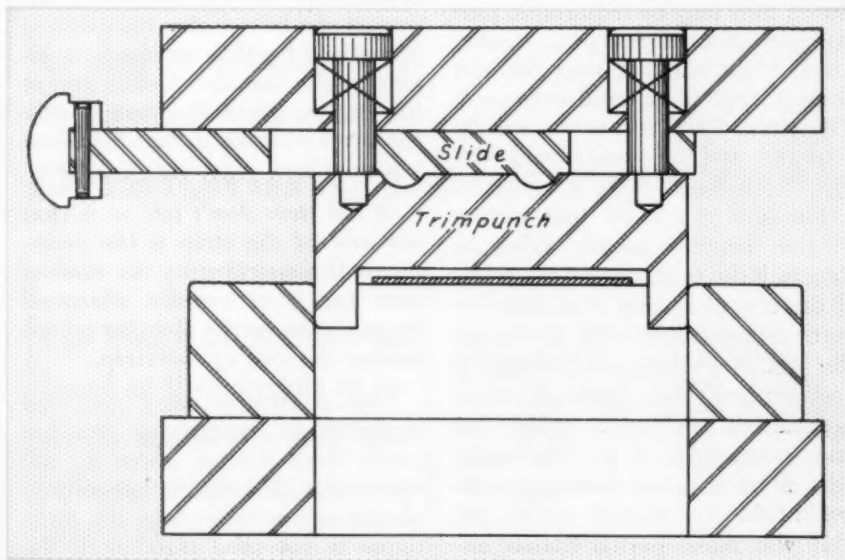
hole. Result—broken punch. Start and end trimmings can avoid this.

Have you ever spent a small fortune to build a progressive die to produce parts in multiples and in no time see it ruined by the clashing of punches against the die edges as they make partial cuts. This causes the die block to chip. Start and end trimmings can avoid this.

A profound failing of a progressive die is the partial blanks



12. STARTING END VIEW. Stroke is down, trim punch down. Sliding mechanism is in metal trimmer.



13. STARTING END VIEW with stroke down, trim punch up, sliding mechanism out and metal not trimmed.

End of the strip—another evil contributing to ruined dies

that are made at the beginning and end of the strip.

These dies are usually accommodated with chutes to segregate the slugs from the blanks. Naturally, what buyer would accept stampings sprinkled with piercing slugs? The chutes segregate the slugs but they do not separate the partial blanks. The possibility of assembling a partial blank to a component part would lead to an ultimate break-down. Start and end trimming can avoid this.

When partial blanks are produced they may be required to pass an inspection of accepted quality level. They will not pass the test if short strips of material were used. Therefore, 100% inspection will be required, and this means hand sorting.

I'm sure you know that sorting in this manner usually takes as long as it did to stamp out the parts. If the cost of sorting is included in your estimate you will never get the job. If you absorb the sorting cost yourself your operating costs are raised, making it easier for your competitor to get the better jobs. Start and end trimmings can avoid this.

If you make partial blanks another waste that occurs is in the

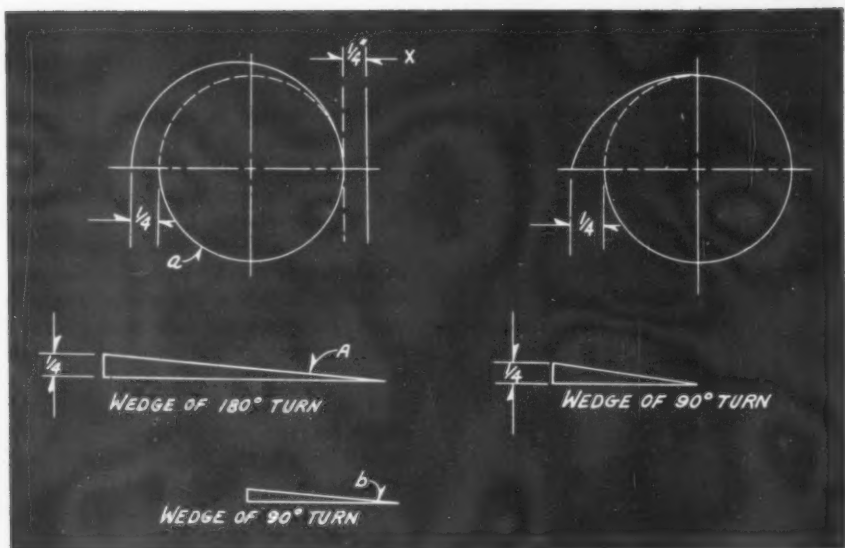
finish of the stamping, such as heat treating, plating and etc. In this comedy of errors, more dollars are going to waste. You can realize how serious this is when you visualize that if you produced twenty hits from a strip, the first and last are incomplete pieces. Start and end trimming can avoid this.

All of these observations are common knowledge among users of press tools as can be evidenced by the editorials and books wherein detail accounts are made to impress on the reader that the starting end of the strip does not rest over a half or part of a hole during the piercing operation. Further emphasis is always made that the starting end of the strip must lie far enough over the blank opening so that the blank punch at least cuts a half of a blank.

What they don't tell us is that the end of the strip is the greatest evil contributing to ruined dies for it is usually obscured from vision by the stripper which covers the end of the strip.

This method of start and end trimming on progressive dies has never been written about to my knowledge. The idea is basically so simple one wonders why the technique is not used throughout the metal industry.

• • •



1. PRINCIPLE OF THE WEDGE in cam design.

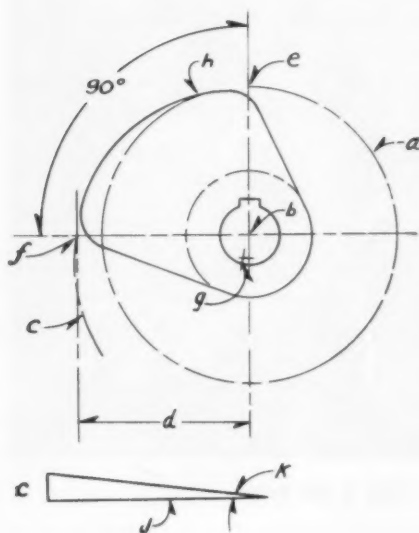
*The taper of the wedge is
the important thing when ...*

Designing Locking Cams

by Alex S. Arnott

Cam designs outlined here are based on the principle of the wedge and deal mainly with holding work during a cutting operation

Locking cams designed for use in clamping work in jigs and fixtures are based on the mechanical principle of the wedge. To obtain maximum holding power and to prevent excessive wear on the cam surface the taper of the wedge is important. When the taper has too much angle the cam will not hold the work firmly and will release itself at the slightest vibration of the cutter. If there is not sufficient taper



2. 90 DEGREE PRINCIPLE, of which 70 degrees of the turn is effective clamping.

the cam will bind, causing unnecessary wear on the workpiece and the cam surface.

A schematic illustration of the principle involved in cam design is shown in figure 1. Here we see a circular disc *a* to represent a wheel on which the cam is to be turned through the distance *X*, $\frac{1}{4}$ ". Below this diagram is shown a wedge, very slightly tapered to a height of $\frac{1}{4}$ ". If it is necessary to turn the cam through 180 degrees, the length of the wedge should be equal to one half the circumference of disc *a*. If only a 90 degree turn is required, the length of the wedge should be equal to one quarter the disc's circumference.

If the wedge is wrapped half way around the circle *a* and then turned through 180 degrees we have the effect of moving the wedge through the space *X*, or one quarter inch. One quarter turn of disc *a* would require an increase in the angle of the wedge if the cam moves $\frac{1}{4}$ ". When the wedge angle is over 15 degrees the cam loses effective holding power, and when it is less than 5 degrees it will bind and jam into an unlocking position. A 10 degree angle for the wedge is generally accepted as an effective angle for cam design.

From the examples it will be seen that the length and height of the wedge has a bearing on the number of degrees through which the cam is to travel. In considering cam movement and effective holding power in cam design, the angle of the wedge is the more important if the best results are to be obtained.

The 90 Degree Principle

The cam shown in figure 2 is a type which is standard design for tool engineering projects and it operates through the 90 degree principle, of which about 70 degrees of the turn is effective clamping; the remaining 20 degrees allows for wear on the cam, discrepancies in the part being held, and a safety factor for holding the work in place. These cams are bored at *b* and have a machine key way to assure a positive motion on the cam shaft.

The layout of this design is as follows:

1. Draw the circle *a* figure 2.



A portable, height adjustable, steel table-truck-work bench! Used for die transfer, machine feeding, assembly (at best height, in best light). For lifting, lowering, transport of all compact, heavy loads. Saves "handling" accidents to both men and materials. Saves minutes for men wherever used.

Write*
for NEW, FREE Bulletin
No. P-2408



IT'S A

Hamilton Tool

USE IT WITH CONFIDENCE

2408



ADDRESS

Recent changes and additions provide many bonus features.

Unobstructed perimeter
(work from any side!)

Six
Wheel
Models



Capacities to 5,000 pounds.

PORTELVATOR[®]

The Handy HAMILTON Portable, Elevating Table

3 table surfaces
4 point support

Four
Wheel
Models



Special
Designs
tool

More Service
for Less Money than
Any other unit of equipment

THE HAMILTON TOOL COMPANY

826 South Ninth Street
HAMILTON, OHIO

Circle No. 293 on Card, Opposite Page 65

2. Add $\frac{1}{4}$ " to the diameter of the circle, the distance the cam is to travel.

3. With a compass set to the dimension d and from centers e and f , strike the arcs g

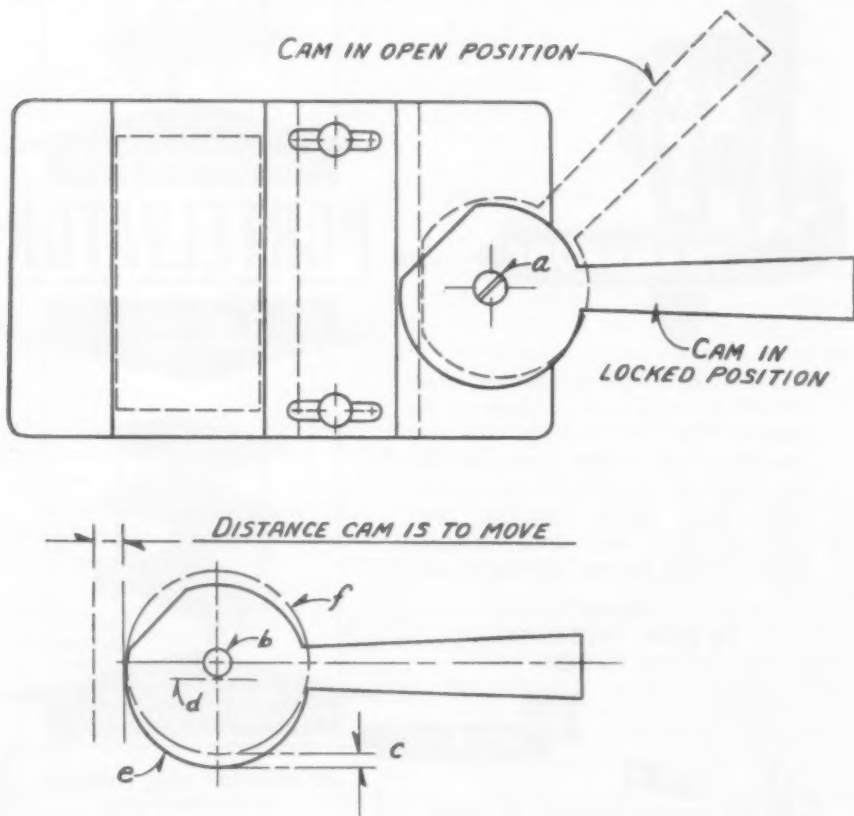
4. From this center draw the line h and round off the corners.

To calculate the amount of taper this wedge will have, draw the line j equal to one quarter the circumference of the circle a . Add the height c , $\frac{1}{4}$ inch and complete the triangle by drawing the

hypotenuse. Measure the angle k and you have the amount of taper in the wedge.

Another type of locking cam is shown in figure 3. The principle of the wedge applies here also and the design is laid out as follows:

1. Draw the circle f from the center lines b .
2. Add the distance the cam is to travel as shown at c .
3. With compass set for the diameter



3. OPEN AND LOCKED POSITION of one type of cam.

IT'S A HAMILTON



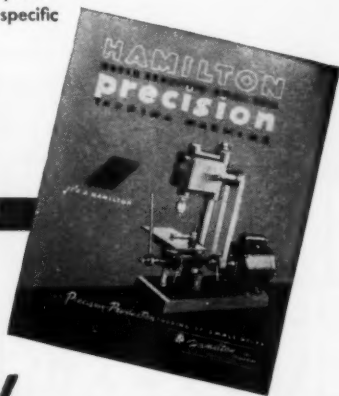
INDEED

There is no way under the sun to do small, precision tapping with "production" speed, satisfactory tap life and acceptable accuracy, other than to use a tool designed for the specific purpose.

**THE *Hamilton* SUPER-SENSITIVE
SMALL HOLE TAPPING MACHINE
IS SUCH A TOOL!**

WANT ALL THE FACTS

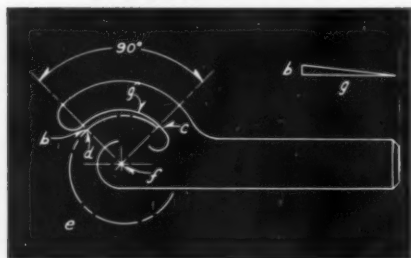
Write for Hamilton Bulletin No. 5203.
Address The Hamilton Tool Company,
826 South Ninth Street, Hamilton, Ohio.



Circle No. 294 on Card, Opposite Page 65

Designing Locking Cams

continued

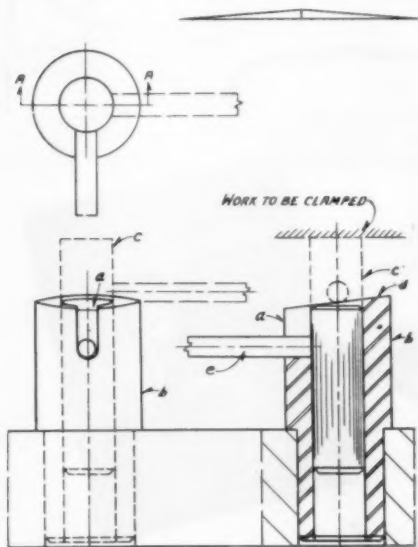


4. LATCH type of cam.

f strike a distance from this new line to the line d.

4. Using center d scribe the circle e.

The flat face on this cam gives ample clearance to remove the work from the jig when it is in the open position as shown in the top view of figure 3.



5. WEDGE ANGLE should be no more than 10 degrees with this type of cam. Section AA.

In the locked position the cam is turned clockwise to engage the surface of the work, locking it in a secure position.

Latch Type of Cam

A latch type of cam is illustrated in figure 4. The wedge principle is applied here in a slightly different form and this cam layout is as follows:

1. Draw the circle e.
2. Lay out the angle of 90 degrees and add the dimension b.
3. From the center c and d and with the compass set to the dimension e strike the arc f.
4. From the center f, inscribe an arc g.

The remainder of the cam may be designed to suit the work involved. The wedge angle may be calculated as shown in previous examples.

3-Piece Unit

Another method of using cams for holding workpieces is shown in figure 5. The cam is easy to machine; it is small enough to work effectively in restricted space areas; it is quick acting and it is positive in its application to the work.

This unit is made in three pieces. The slot a in the housing b holds the stock c. The top of the housing has an incline plane after the principle of the wedge. The handle e is inserted in the bar stock and by lifting in through the slot in the housing and turning it in either direction on the incline plane the bar stock advances toward the workpiece. When the bar engages the work and pressure is put on the handle the clamp wedges into

NOW

CUT COST OF PRECISION GEAR PRODUCTION

5410

THIS FEATURE: "Independent selection of speed, feed and indexing," sets the Hamilton Precision Small Gear Hobber apart from the field,

AND ENABLES the users of this machine to vary speed and feed to suit the material being machined.

THIS FACT, and a "reserve of accuracy" built into the machine, work spindle and hob spindle runout of less than .0002" as an example,

CONTRIBUTES to more gear precision with no sacrifice of gear production,

OR INCREASED gear production with no sacrifice of gear precision,
..... OR BOTH!

Prices and specifications without obligation

ASK FOR FREE BULLETIN 5410

Address

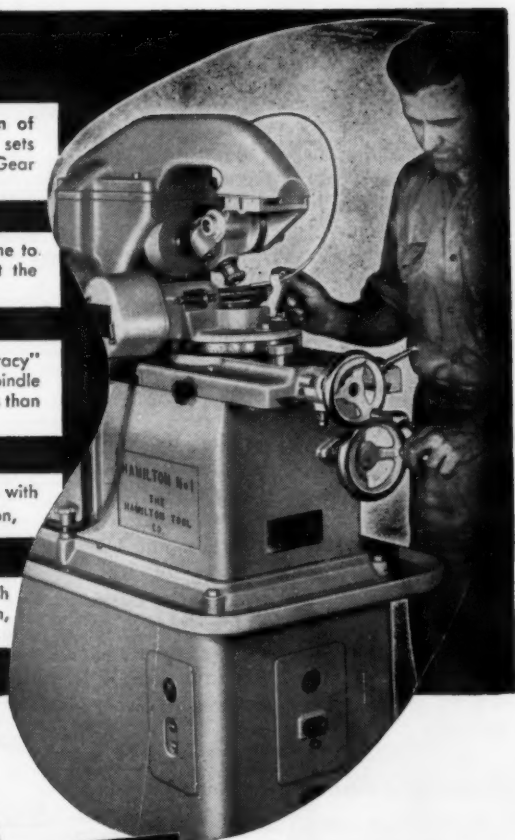
The Hamilton Tool Company
826 South Ninth Street
Hamilton, Ohio



IT'S A

Hamilton Tool

USE IT WITH CONFIDENCE



place, holding the work for the cutting operation. The further the handle travels up the incline plane the more effective the wedging action is.

A diagram showing this cam as a double feature design is illustrated in the upper portion of figure 5. This type cam should not have a wedge angle of more than 10 degrees to be effective in operation.

Double Face Cam

The double face cam shown in figure 6 is used when two pieces of work are simultaneously held in a fixture. Each face wedges a single piece of work in place. The cam layout may be drawn as follows:

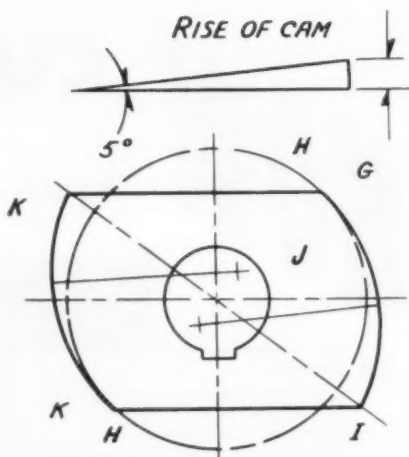
1. Draw the circle G.
2. Lay off the lines H for the width of the cam.
3. Draw the line I from corner to corner.
4. Mark off the distance the cam is to move as shown at L.
5. With the compass set for the circle G strike the arcs J from the points K.
6. With the same setting of the compass draw the cam surface line L.

This completes the design of the cams, and the illustration above it outlines the angle of the wedge used. For all heavy duty work where holding power must be at a maximum, a 5 degree angle on the taper is recommended.

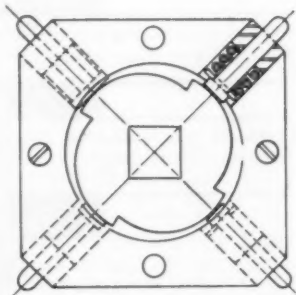
Four Face Cam

A four face cam illustrated in figure 7 shows still another variation in the design of cams for holding workpieces. In this design the cam has four faces which make contact with the workpiece simultaneously.

• • •



6. DOUBLE FACE CAM used when two pieces of work are simultaneously held in a fixture.



7. FOUR FACES of cam make contact with workpiece simultaneously.

For almost any internal grooving problem . . .

PREMIUM QUALITY RECESSING TOOLS

**DESIGNED BY SCULLY-JONES TO
CUT CAPITAL AND OPERATING COSTS**

These benefits	.. for these reasons	.. result from these PREMIUM features
REDUCE COSTS	Minimize need for special machinery.	1. Simplify intricate recessing and grooving operations on standard machines, such as drill presses, radial drills, turret lathes, and chucking machines.
	Reduce skill requirements and labor costs.	2. Position tool and control depth of cut automatically.
	Eliminate down-time.	3. Hardened and ground parts assure long life and trouble-free operation on precision work.
	Cut tooling costs.	4. Interchangeable tool bit holders or circular form cutters easily and quickly adapt tool for a variety of special operations.
		5. Hardened and ground steel pilot fits standard bronze bushing.
INCREASE ACCURACY	Simplify accurate settings.	6. Interchangeable hardened and ground steel pilot or stop collar made to suit specific requirements. Stops against and pilots in work.
		7. "Quick-Lock" nut sets depth of undercut to within .001 in.
INCREASE PRODUCTION	Speed operations.	8. Adjustable stop collar assembly locates position of undercut in hole to within .001 in.
		9. Adjustments controlling location and depth of groove are simple and fast.
		10. Positioning of tool and cutting cycle are fast and efficient.

**SCULLY
JONES**

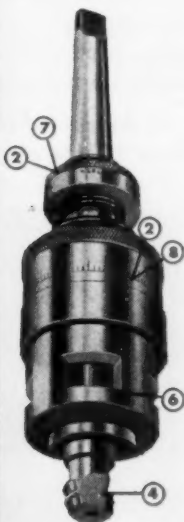
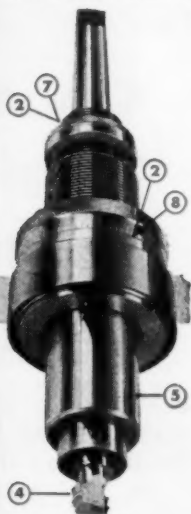
Call your Scully-Jones factory-trained representative or distributor for complete information and prices.

PRECISION HOLDING TOOLS
"Precision Holding" for holding precision

Scully-Jones and Company, 1907 South Rockwell St., Chicago 8, Ill.

Circle No. 296 on Card, Opposite Page 63

TYPES "J" AND "C"
Pilot in fixture bushing.
Can be modified to pilot in and stop against work.



TYPE "R"
Pilots in and stops against workpiece.

New Applications in

Ceramic Tipped Tools

SPECIAL TO MACHINE & TOOL
BLUE BOOK

● With the availability of new ceramic materials Raybestos Div. of The Raybestos Manhattan, Inc. and L. H. Chappel & Co. have developed a full line of applications utilizing the cutting strength and wear properties of their new ceramic trademarked ke-ram'ik.

A survey of these new applications shows clearly that ceramic

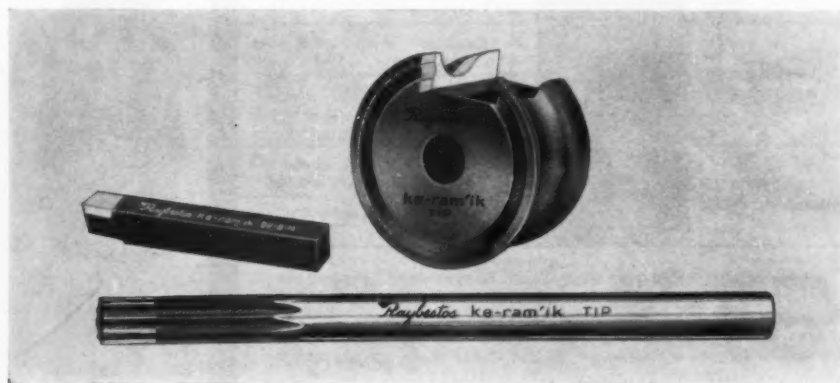
as developed by these companies has few limits as to use. Heretofore it was thought to be useful only in material cutting.

On a component machined of 4140 heat treated steel where no other cutting medium was found to be successful the ke-ram'ik tool with a 7° lead angle, using a minimum front clearance for support, and with a 0° back rake has given excellent tool life and finish.

The bonded tip makes good use of the inherent strength of a normal tool shank. Tool geometry was adjusted to fit the applications. The tool was designed with the knowledge that varied situations with regard to metals, feeds, and speeds would require varied tool geometry.

For example, recently when machining a silver alloy a 6° lead angle, 5° front clearance, and a 3° negative back rake had to be used.

The life of this tool was 80 hours



A FEW OF THE MANY POSSIBLE TYPES of tools to which ceramic tips have been affixed.

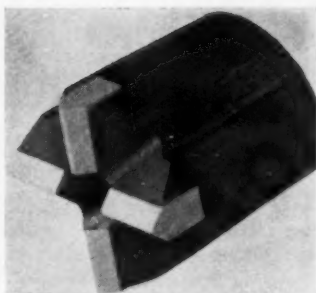
as compared to a previous high of 4 hours with other types of tooling.

The bonding properties of these ceramic cutting tools make it possible, for the first time, to produce form tools of all descriptions.

A circular form tool for automatics is currently being used successfully on brass and is producing a 10 micro inch finish. Once again the lack of metal build-up is extremely important in maintaining finish and producing long tool life.

In fulfilling the demand for a complete ceramic cutting tool line, straight flute reamers from $\frac{3}{8}$ " up are being tipped successfully.

The inherent resistance to abrasion and wear makes this ceramic material ideal for wear parts, wear strips and drill bushings. Drill bushings already in use have proved a



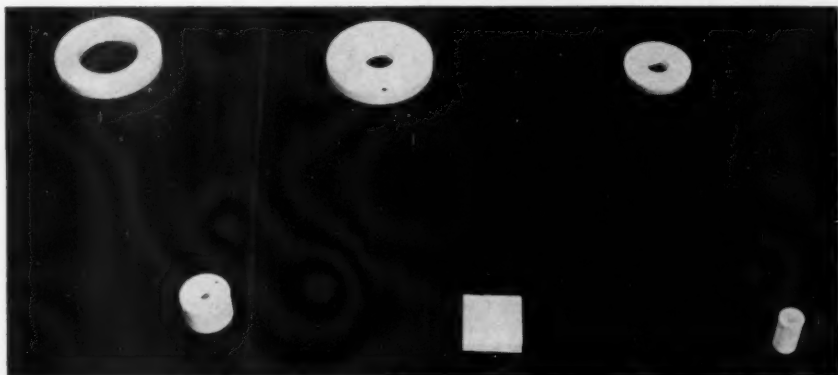
STAR DRILL with ceramic tips.

guaranteed concentricity, particularly in the smaller deep hole sizes.

Ke-ram'ik inserts may be bonded to precision, close tolerance parts without the usual distortion to the metal member brought on by the heat of brazing.

The development of wire drawing dies and rock drilling bits constitutes another example of universal use of ke-ram'ik. Basic testing of these components indicates further wide fields of successful application.

• • •

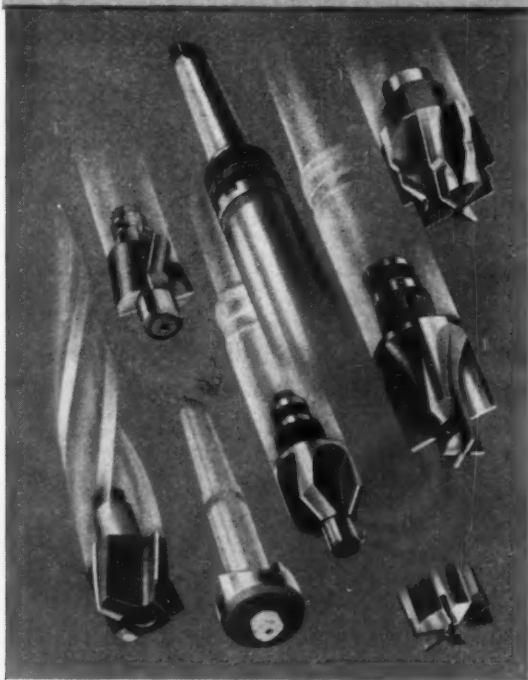


WEAR PARTS made from oxide base material.

WHAT "Engineered by Eclipse"

Means to 2000 Companies

Since 1913 Eclipse has been consistently and efficiently serving many companies in widely diversified fields of production: automotive, farm implement, aircraft, household appliance and other metal fabrications. Each of these companies has found that "Engineered by Eclipse" is assurance of genuine quality in end cutting tools. Eclipse is represented in every major industrial market . . . for your convenience.



- High Speed Steel Cutters
- Carbide Tipped Cutters
- Core Drills
- Inserted Blade Cutters
- Multi-Diameters
- Back Spotfacers

AND NOW Eclipse has added to its line . . .



**Precision
END MILLS**

Ground from the solid for longer tool life and finer finishes.

Write for Counterbore Cat. No. 51

Write for End Mill Cat. No. 56











ECLIPSE COUNTERBORE COMPANY

1600 BONNER AVE., DETROIT 20, MICHIGAN

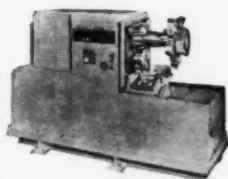
Circle No. 297 on Card, Opposite Page 65

WARNER & SWASEY 2 AC AUTOMATICS

pay for themselves with one year's savings
at Thew Shovel Company

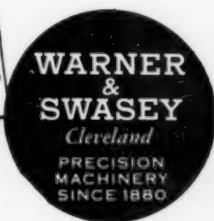
PRODUCTION RECORD				
PART	PART NAME	OLD TIME	NEW TIME	MONTHLY TURNOVER
	Pinion	.280 hours	.087 hours	100
				69.0%
	Roller	.392 hours	.087 hours	2000
				77.8%
	Sprocket	.376 hours	.177 hours	175
				52.4%
	Roller	.373 hours	.126 hours	447
				66.2%
	Roller	.372 hours	.141 hours	109
				62.2%
	Spacer	.074 hours	.039 hours	770
				47.2%
	Box	.431 hours	.193 hours	108
				55.6%
	Box	.504 hours	.231 hours	36
				54.0%

Cost savings from 47% to 77%! That's the production record of two Warner & Swasey 2AC Automatics on small and medium lot work at Thew Shovel Co., Lorain, Ohio. Annual dollar savings exceed the cost of both machines plus tooling! On small and medium lot work these automatics can undoubtedly return substantial savings for you. To discuss their application to your work, call in our Field Engineer.



1 AC CHUCKING MACHINE
8" or 10" Chuck—6" Working Stroke

2 AC CHUCKING MACHINE
10" or 12" Chuck—9" Working Stroke



YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

Circle No. 1A on Card, Opposite Page 65



It's not always possible to launder *all* chips or filings out of ordinary wiping material. Chips come back to scar men and metal, to plague your production line. This man has already had 4 wiper cuts.

He had 4 wiper cuts last month



Easy to distribute ...
always a clean one handy



They really soak up oil ...
good for solvents, too



When thoroughly used ...
toss 'em in the trash



Chips can't hide in a clean Scott Wiper. Each Wiper is new, fresh from the carton. A man takes a Scott Wiper as he needs it . . . for his face, his hands, his product.

. . . He had none!

The difference is . . . Scott Wipers

This is sanitary wiping. A man uses a Scott Wiper thoroughly, throws it away—takes a new one. No danger of cuts from hidden chips . . . no fear of skin infection from dirty wipers . . . when you take a fresh wiper.

With disposable Scott Wipers, handling and distribution are simplified. Laundering, sorting and baling are eliminated.

Your Scott representative or dis-

tributor will demonstrate any time you say. Call him or mail coupon.



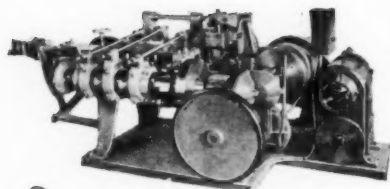
Scott Paper Co., Dept. 5-M
Chester, Pa.
Send information on Scott Wipers.

Name _____

Company _____

Position _____

Address _____



COMBINATION PRESS AND FOUR-SLIDE FORMING MACHINES

Available in 4 Models.

Features Built-In Crank Press

Feed capacities: 8, 10, and 15 inches

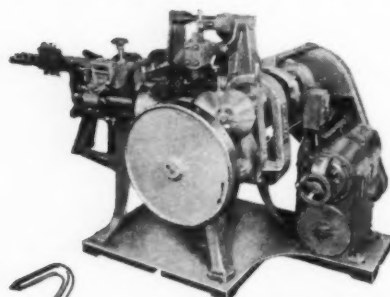
Press capacities: 8, 12, 20, and 30 tons

Max. width of stock: 1 1/4, 1 1/2, 2, and

2 1/2 inches, as ordered

Stroke of press: 3/4, 7/8, 1, and 1 1/4 inches

Net weights: 2560 to 9700 lbs.



FOUR-SLIDE WIRE FORMING MACHINES

Built-In 10 Models Rated By Wire

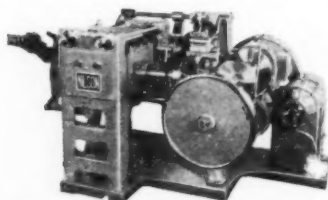
Capacity Will Form Ribbon Metal Also

Wire diameters formed: approx. 1/64

through 1/2 inch

Feed lengths available: from 3 to 32 inches

Net weights: from 600 to 18,500 lbs.



HEAVY DUTY COMBINATION FOUR-SLIDE MACHINES

Available in 2 Models.

Features Built-In Toggle Press

Press capacities: 50 and 75 tons

Max. feed lengths: 11 1/2 and 16 inches

Max. width of stock: 2 and 2 1/2 inches

Stroke of press slider: 3 and 2 1/2 inches

Net weights: 9535 to 12,700 lbs.

NILSON OFFERS 5 BIG SAVINGS

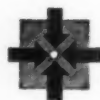
IN FORMING WIRE OR RIBBON STOCK

NILSON 4 - SLIDES FEATURE —

- 1 **AUTOMATIC OPERATION**
From coil to final formed part.
One man can operate 3 or 4 machines.
- 2 **INCREASED PRODUCTION**
50 to 400 pieces per minute depending on size.
- 3 **NO SECONDARY HANDLING**
Straightening, cutting off, stamping and forming
all in one operation.
- 4 **IMPROVED PRODUCTS**
Closer control and precision in stamping and
forming parts assures uniformity.
- 5 **LOWEST INITIAL COST**
Choice of 16 models for efficiency and economy.

Nilson engineers are always available for consultation
on forming problems. Bulletin #61 sent on request.

Nilson's 3 tilt reels and 3 stationary models handle wire
or ribbon stock coils up to 500 lbs.



A.H.
NILSON
MACHINE COMPANY

1511 RAILROAD AVENUE, BRIDGEPORT 5, CONN.

Automatic Chain Making Machines • Staple Forming Machines • Wire and Stock Reels • Wire
Straightening Equipment • Slide Feeds for Presses • Wire and Ribbon Stock Forming Machines

Circle No. 1D on Card, Opposite Page 65

Can Management Demote a Worker and Turn His Duties Over to a Foreman?

What Happened:

The company maintained a small janitorial staff of 5 to 7 employees on the day shift and about the same on the night shift. Each group was supervised by a leadman who did the same work as the other employees but exercised some minor overseeing. The leadman on each shift was a member of the union.

After the company had received a number of complaints about poor janitor service, it determined to do something. Upon investigation, it found that the janitorial group had very little supervision. The maintenance foreman, who was supposed to have over-all supervision, was too busy with other duties, thus leaving the leadman in control.

The company decided to reorganize the janitorial service. It created a new job, "Custodian Foreman," which was outside the bargaining unit. In view of the fact that the foreman was to take over active supervision, the job of leadman was eliminated and the incumbents demoted to "janitor" with a pay cut from \$1.50 an hour to \$1.44.

The union put in a grievance.



It admitted that management had a right to eliminate a job, but it couldn't assign the duties to a supervisor. The new foreman, the union said, had taken over many of the functions of a leadman, and management had no right to do that.

The company argued:

- We didn't eliminate a job at all. We created a new job of "custodian foreman." Therefore it is no longer necessary to maintain a leadman because this would result in duplication of supervision.
- The staff isn't big enough to have a leadman and a foreman.
- The new foremen are not do-

Right or Wrong

continued

ing the work of regular employees. They are only taking over the supervisory functions of a leadman.

Was The Company:

RIGHT ☐ WRONG ☐

What A Board of Arbitration,
Edgar L. Warren, Chairman,
Ruled:

"Any encroachment on the job territory of the union, no matter how well intentioned, would be a potential threat to the union's security. However, the determination

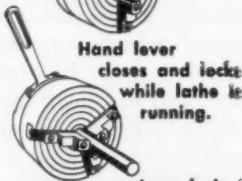
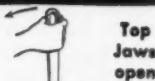
of the kind and amount of supervision required to assure adequate performance of a work force is clearly the function of management. The leadmen spent only a very small proportion of their time in supervision. The new foremen spend all their time in supervision. They lay out the work, prepare instructions, keep records and supplies, hire, discipline and discharge. None of these functions were performed by the leadmen, so it cannot be said that the foremen's jobs were created from duties formerly carried out by leadmen. Grievance denied."

Labor Saving Production CHUCK

Will pay for itself in 60 to 90 days

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days. Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.

Write for bulletin 201 today.



Jaws locked



CHUCK DIVISION
THOMAS HOIST CO.
24 S. HOYNE CHICAGO 12, ILL.

Circle No. 298 on Card, Opposite Page 65

Can You Assign a Woman to a Man's Job and Pay Her Less?

What Happened:

For many years the work in a particular department was performed by men. It was mostly machine operated. When more machines were added, the company decided to transfer some women from another department to operate these units. The women were paid their old rate which was 15c an hour below what men were getting on these same machines. Production was about the same. The women protested their lower rate on the grounds of equal pay for equal work. The company stood its ground. It held that:

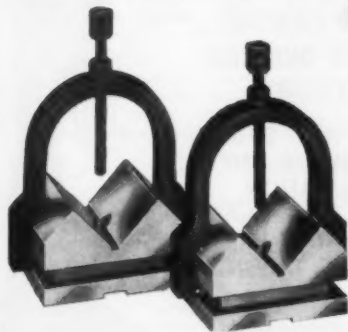
- There is nothing in our agree-



ment that requires us to pay equal rates to women for the same jobs.

- We have a right to transfer employees to other jobs.
- We have no iron-clad job rates.

accurate to .0002" over 6" UNI-V-BLOCKS



by Precision Tool

This block is guaranteed accurate to a tolerance of .0002" T.I.R. in the following ways:

HOLE CENTER	All are accurate to each other in within .0002" over a matched pair. Dimensionally stabilized!
KEYWAY	
SIDES	
THE V	

Shown here is MODEL No. 3000
(2-7/32 x 4-3/4 x 2-15/16")

PRECISION TOOL AND MFG. CO.
of ILLINOIS
1305 S. Laramie Avenue, Cicero 50, Illinois

UNI-V-BLOCKS are also available as:
MODEL 5000 (4-5/16x5-1/8x5-3/8")
MODEL 1250 (1-1/4x1-1/4x1-5/8")

Attach this ad to your letterhead for FREE literature!

MT-10

Right or Wrong

continued

Some pay more—some pay less. Our operations are such that we must transfer employees freely from one operation to another. There is nothing in our practice that says we must change their rates with every transfer we make.

Was The Company:

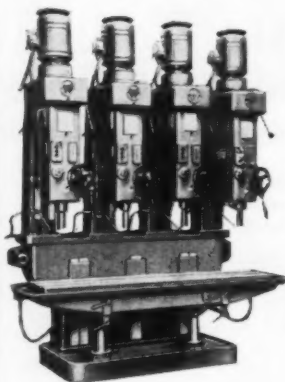
RIGHT ☐ WRONG ☐

What A Board Of Arbitration, B. Meredith Reid, Chairman, Ruled:

"In the contract between the company and the union, there is no clause which limits manage-

ment's right to assign the work in question. In the absence of such specific contract provision which imposes such restriction, the basic principle controls that a company has an inherent, an absolute, an exclusive right to operate its business and plants and direct the work of its employees in any manner not prohibited by law, or by collective bargaining agreement, or contrary to the rights of its employees.

The union cannot by means of arbitration and the use of the grievance machinery arrive at a net result of a higher rate for performing a specific operation than was actually negotiated between the parties. Arbitration cannot extend or enlarge the agreement. The grievance is denied."



"WEBO"

**WORLD FAMOUS
UPRIGHT DRILLING
MACHINES**

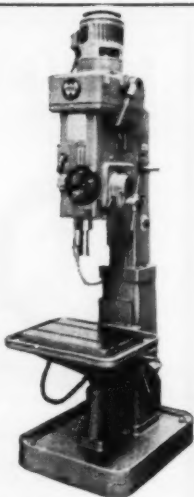
MULTIPLE AND SINGLE
SPINDLES OR ANY
COMBINATION
CAPACITIES $\frac{3}{4}$ " to 2-7/16"
WITH OR WITHOUT SEMI-
AUTOMATIC TAPPING.

**WE SOLICIT
YOUR INQUIRIES**

DISTRIBUTORS IN UNITED STATES

CENTRAL & WESTERN STATES
JAMES W. GEORGE MACHINERY CO.
519 EAST JEFFERSON AVENUE
DETROIT 26, MICHIGAN

NEW ENGLAND & ATLANTIC STATES
TRANSMARES CORP.
15 WILLIAM STREET
NEW YORK 5, N.Y.



Circle No. 300 on Card, Opposite Page 65



Why CIMCOOL leads the parade...

There are 3 booming reasons why CIMCOOL® is way out in front—actually the largest selling chemical cutting fluid in the world. And each deserves a rousing cheer as they pass in review:

- ① **CIMCOOL LOWERS COSTS** because it's longer lasting in machines. Thus, it reduces down-time and cuts labor costs for cleaning and changing.
- ② **CIMCOOL DOES A BETTER JOB** because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.
- ③ **CIMCOOL IS CLEAN**, doesn't soil hands or clothing. It contains no skin irritants. It leaves no slippery film on shoes, floors, machine or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

For complete details on all the advantages of CIMCOOL Concentrate, consult your CIMCOOL distributor. Or contact us direct and we'll send one of our Cincinnati Milling-trained machinists to call on you—without cost or obligation. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

*Trade Mark Reg. U.S. Pat. Off.

CIMCOOL CUTTING FLUIDS

CIMCOOL Concentrate—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL Tapping Compound—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS—The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT Base Additive—For jobs requiring an oil-base cutting fluid. Added to mineral oils, it gives an economical mix for higher speeds and feeds.

CIMCOOL Bactericide—The most effective agent yet developed to overcome rancidity and foul odors.

CIMCOOL Machine Cleaner—The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

CIMCOOL

Cutting Fluids

for 100% of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

Can You Discipline a Union Officer for Questioning the "Integrity of Management"?

What Happened:

Jack Hamilton complained to his shop steward about not getting a merit raise. The union officer suggested that they go out and talk to the plant manager. When they got to the manager's office, he was out. The steward told the manager's secretary to "get him here quick." The girl called her boss on the intercom system.

The manager rushed to his office from the plant, and when he saw that he had been summoned to meet with the worker and steward,



he was quite miffed. "What do you fellows want now? I'm very busy and don't have much time to give you," he said.

When he learned of their mission,

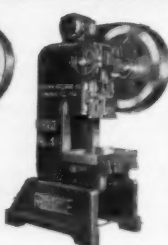
You Can Rely on a **ROUSSELLE**



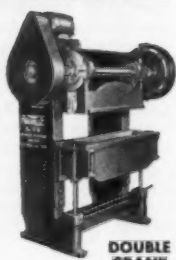
DEEP
THROAT
PRESS



HORN
PRESS



O.B.I. PRESS



DOUBLE
CRANK
PRESS

THESE 40-TON PRESSES

take job after job in stride and give you top speed and uniform output on a variety of work. They stress simplicity in every detail to achieve quicker set-ups, easier changeovers and simpler operation. All are extra rugged, high precision units, made to withstand hard usage and assure long, satisfactory service. They are very *moderately priced*.

Manufacturers of Rousselle Presses

Significant savings may result if you let our engineering staff assist you. There is no obligation.

Rousselle Presses are sold exclusively through leading machinery dealers.

Choice of 25 models in 5 to 40-ton sizes.

SERVICE MACHINE CO. 2310 West 78th Street • Chicago 20, Ill.

Circle No. 302 on Card, Opposite Page 65

the manager took out Hamilton's personnel and production records, and discussed the reason for the turndown of the merit raise. The two men left. That evening, when the steward got home, he wrote a strong letter to the plant manager. He accused the management man of being "surly" and charged that the information in the employee's file was "false, misleading and ill-prepared."

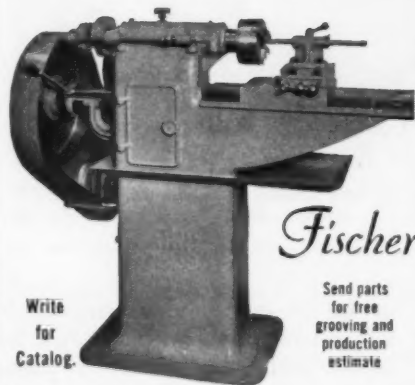
When the manager received the note, he blew his top. He called the steward in and gave him a week's suspension on the grounds of insubordination. The steward took issue, and when the case came to arbitration, he said that the

words "false," "misleading" and "ill-prepared" were not directed *personally* at the plant manager, but were simply descriptive of the inadequate records that were being kept. Was the Company:

RIGHT ☐ WRONG ☐

What Arbitrator Al T. Singletary Ruled:

"I find that the letter contains language which, on the face of it, is offensive, and questions the integrity of the plant manager as well as the accuracy and reliability of the company's records. I feel that it is up to management to curb and discourage such improper conduct, and therefore, the one week's suspension is not excessive."



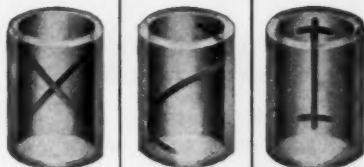
Write
for
Catalog.

Send parts
for free
grooving and
production
estimate

Fischer

ESTABLISHED 1900

FISCHER MACHINE CO.
ELEVENTH & WOOD STS. • PHILADELPHIA 7, PA.

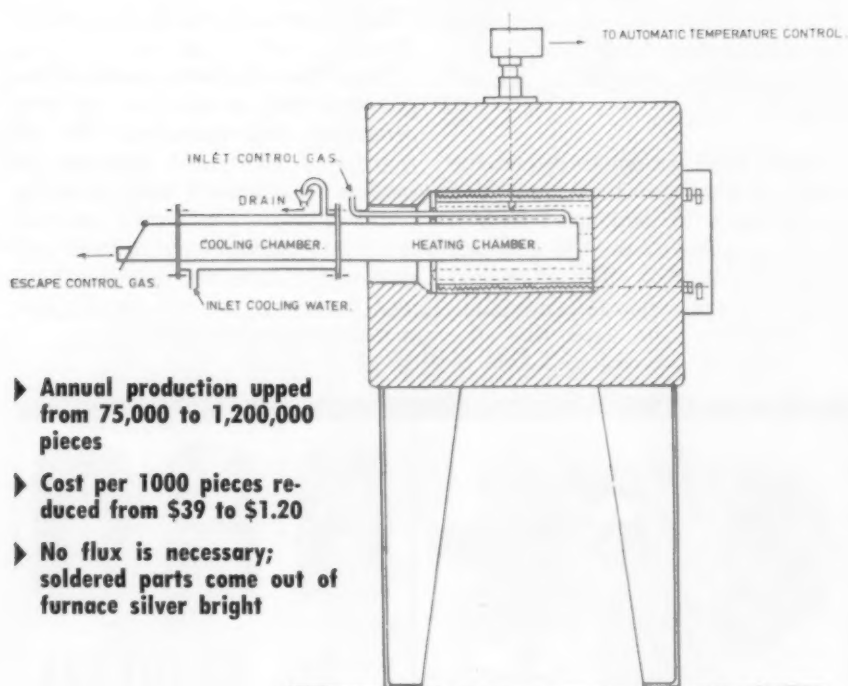


... OIL GROOVERS

The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc. This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.

*16 times more production
when they switched to . . .*

Soldering in a



- ▶ **Annual production upped from 75,000 to 1,200,000 pieces**
- ▶ **Cost per 1000 pieces reduced from \$39 to \$1.20**
- ▶ **No flux is necessary; soldered parts come out of furnace silver bright**

By **A. C. Starrenburg**
Atlas Maritime Corp.

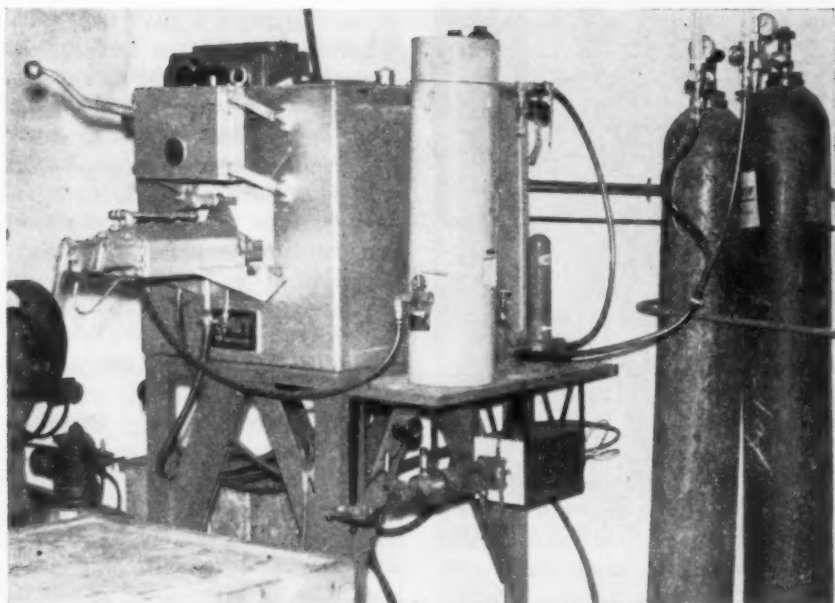
● We solder thousands of small steel parts. Formerly this was done with silver solder on a rotating holder equipped with a hydrogen burner.

Before soldering, the parts had

to be cleaned and degreased in a trichloreathynene plant, first by liquid and followed by a vapor treatment. After being cleaned, these parts could only be handled with the aid of tweezers, in order to keep them clean and free of grease.

A suitable soldering flux was

Controlled Atmosphere



GENERAL LAYOUT of electric furnace used for soldering. See schematic drawing on preceding page for view of heating and cooling chambers.

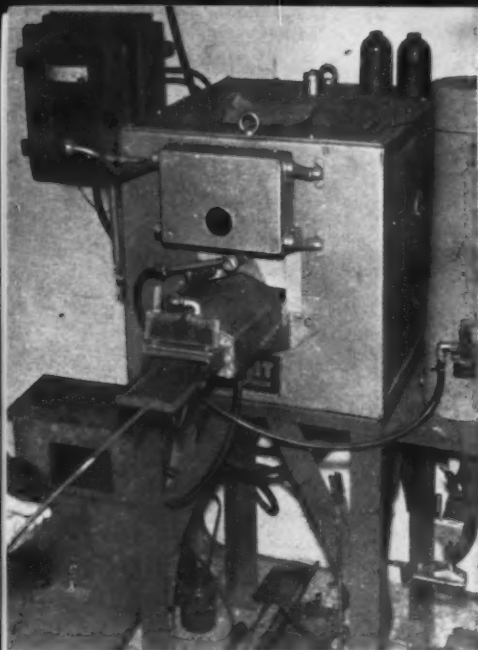
brought up and so was the silver solder.

After soldering the parts had to be boiled in a diluted hydrochloric or sulphuric acid bath to remove the adhering molten flux. All remaining traces of acid had to be neutralized in a sodium carbonate bath, followed by rinsing in hot

water and drying in wood dust. Finally all wood particles had to be removed.

In this manner the production of one man was about 250 pieces per eight-hour shift.

After elaborate testing an electric furnace was provided with a combined soldering and cooling



NOW electric furnace is loaded.

chamber as shown in the drawing.

The heating chamber was made of pirex 60/13 heat resisting alloy, welded by Argon-arc. The cooling chamber was welded from normal sheet steel and connected with flange and bolts to the heating chamber with a rubber gasket in between, to obtain gastight connection.

The front of the cooling chamber was provided with a hinged lid with a small opening for the handle bar of a shovel, also made of heat resisting alloy. With this the parts to be soldered were pushed in the heating space.

A tube of heat resisting alloy was welded to the aft part of the heating chamber; through this a suitable

gas could be supplied to eliminate air from the heating and cooling spaces.

The furnace is provided with automatic temperature control, which can be set to any required temperature between 200 and 1200° C. The electric consumption of the furnace is 6 kw.

Before starting, the temperature control is set to 1100°C and the cooling water turned on until a small steady flow passes to drain. However, about two hours before work starts the current is switched on by means of a time switch, so that the furnace has the necessary temperature in the morning. As soon as soldering starts, the control gas is turned on.

The parts to be soldered are placed on the shovel, which is pushed in the heating chamber. After a suitable heating time the shovel is pulled back in the cooling chamber and left there for some time to cool down. The shovel is pulled out by lifting the hinged lid. Immediately afterwards a second shovel, filled with another set of parts, is pushed in. The cooling chamber, between soldering and pulling out, is necessary to avoid oxidation of the steel parts.

Elaborate tests with several gases proved that inert gases gave no results; the controlled atmosphere had to be a reducing one.

Hydrogen proved to be excellent, but was very explosive. Although no harm was done, the sharp detonations which occurred every time

the lid was lifted were very annoying. By mixing hydrogen with nitrogen, detonation was overcome and the soldering was as good as with hydrogen only.

Another trouble was caused by the varying quantities of oxygen contained in the commercial hydrogen and nitrogen. Even traces of oxygen had a bad influence on faultless soldering.

This oxygen was removed by passing the gas mixture over a special palladium catalyst, which brings about combination of hydrogen and oxygen in the ratio of 2:1 by volume, to form water vapor. The water vapor is carried away in the gas stream.

This water vapor, when entering the heating chamber having a temperature of 1100°C., decomposed again and formed oxygen. This was removed by passing the gas coming from the palladium purifier through a Silica-gel dehydrator.

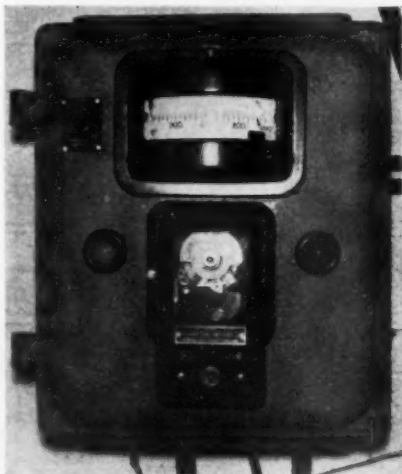
The gases delivered in commercial gas bottles at high pressure were reduced in pressure and regulated in quantity by flowmeters.

A supply of 2 liters of hydrogen and 8 liters of nitrogen per minute was sufficient to drive out and keep out all air from heating and cooling chambers. After passing through both chambers the gas mixture could escape through the small opening in the hinged lid where it could be ignited. Using the above mentioned method of soldering, the parts need no longer be scrupulously cleaned; in fact they can be

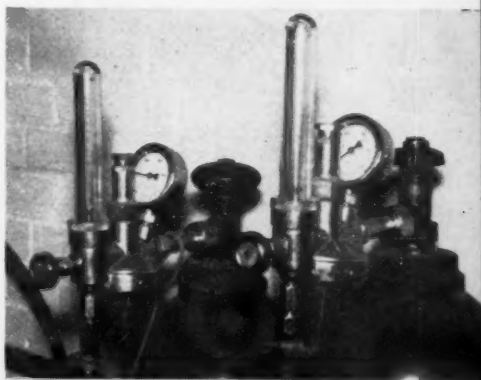
rusty or covered with oil without any harm.

The silver soldering-ware was substituted by commercial phosphor-bronze wire and no flux at all was needed.

In either way of soldering, with silver or phosphor-bronze, much



TEMPERATURE REGULATOR with time switch.



CLOSE-UP of the flowmeters.

Soldering

continued

trouble was caused by the soldering alloy, which wetted all parts so thoroughly that in a short time the bottom of the shovel was covered with silver or phosphor-bronze, causing the parts to stick to the bottom.

This difficulty was overcome when the bottom of the shovel was made of heavy gauge nichrome.

Using this method of soldering the production was raised from 250 pieces to 4000 pieces per 8 hour shift. Not only were labor costs reduced, there were savings in gas consumption.

Annual production was increased from 75,000 pieces to 1,200,000 pieces. The cost per 1000 pieces for labor (without overhead expenses), materials and depreciation was reduced from \$39.00 to \$1.20.

• • •



High Speed

Extruded teflon rods are pre-sized to finished parts specifications at centerless belt grinding rates up to 1000 feet per hour.

SPECIAL TO MACHINE & TOOL BLUE BOOK

● High-speed belt grinding at the Manheim, Pa. plant of Raybestos-Manhattan permits pre-sizing of teflon rods to meet finish specifications of component parts. Elimination of stock variations also

ABRASIVE BELT is backed by 85-durometer contact roll. Adjustable helix angle of regulating wheel and different gear ratios in wheel drive provide variable through-feed rates.



Belt Grinding of Teflon

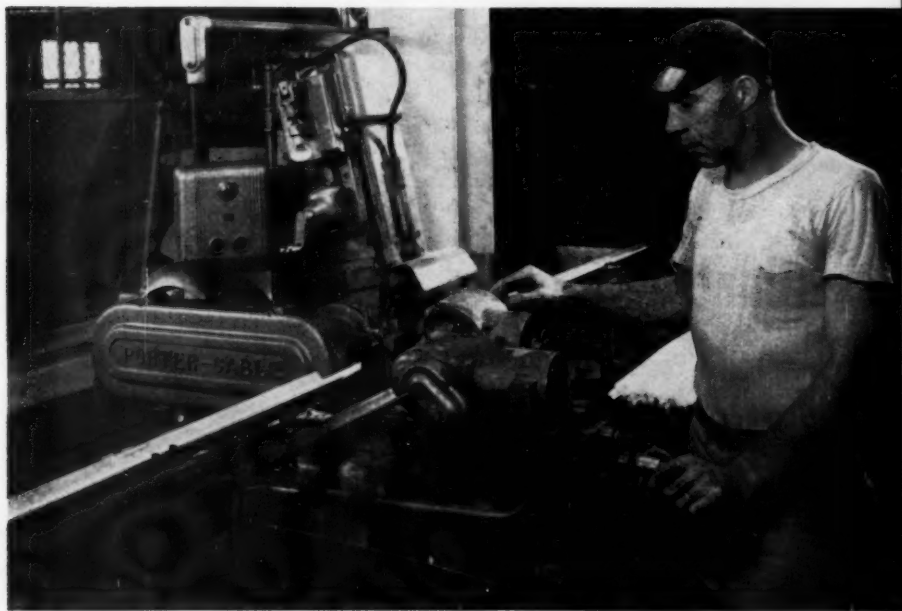
facilitates subsequent screw machine operations.

The teflon rods, from $\frac{3}{16}$ -inch to $2\frac{1}{4}$ -inches in diameter, are used in the manufacture of electronic components: valve seats, coaxial cable connectors, rings, washers, etc. Stock variations—an uncontrollable condition typical of teflon processing—range from plus .008 to .010-inch on smallest diameters, to as much as plus .060-inch on largest rods. Lack of dimensional uniformity often impeded turning operations, as screw machine collets

could not grasp rods with sufficient accuracy.

Rods are now ground and polished on an Engelberg through-feed centerless belt grinder, which insures uniform sizing, eliminates machining rejects, and permits Raybestos-Manhattan to "anticipate" various dimensional and finish requirements of completed component parts. Four-foot rods are sized to within .001-inch (on smaller diameters), at through-feed rates of from 1,070 feet per hour on $\frac{3}{16}$ " rods, to 98 feet per hour on $2\frac{1}{4}$ -

EXTRUDED TEFLON RODS, in four-foot lengths, are centerless ground on Engelberg abrasive belt machine at through-feed rates of 100 to 1000 feet per hour, depending on diameter. Machine permits precision tolerances, down to plus or minus .001-inch on smallest ($3/16$ to $5/16$ -inch) rods.



inch and 2½-inch rods. The Model L-4 belt grinder is manufactured by Engelberg Huller Company, Syracuse, New York.

Abrasive belts are 4x54 inches, with belt speed constant at 5,000 sfpm. Belt is backed by 85-durometer contact roll, 8 inches in diameter and 4 inches wide.

Belt sequence is as follows:

1. Elimination of stock variations: 50-grit, silicon carbide belt, wet. Stock removal ranges from .010 to .030-inch. Rods from ⅜-inch to 1½-inches in diameter require a single 50-grit pass, while larger rods are rough ground in two passes.
2. Final sizing and finishing: belt used is 320-grit, silicon carbide, wet, with single-pass stock removal, for all rods, of .002 to .004-inch. Tolerance control depending on diameter, to within plus or minus .001-inch.
3. Polishing: in final pass, rods

are polished with dry canvas belt. This operation also prevents feathering of teflon rods when they are cut to size.

Rate of through-feed at which machine is set is determined by diameter of rods. Adjustable feed angle of the 80-grade regulating wheel is set at 5 degrees for all passes. In combination with this helix angle, feed rates are controlled by change gears, which drive regulating wheel at different rpm. Change gears are readily accessible, requiring less than a minute to change from one ratio to another.

Maximum setup time, including adjustment of two eight-foot outboard supports, is approximately 20 minutes.

Through-feed rates established by Raybestos-Manhattan for the four-foot rods of teflon (Dupont's trademark for solid, granular polymers of tetrafluoroethylene) are listed in the table below.

O.D. of Rods	RPM of Regulating Wheel	Through-feed rates (inches per minute)
⅜" to ⅞"	130	214
½" to 1"	90	148
1¼" to 1½"	35	57
1⅝" to 2"	20	32¾
2¼", 2½"	12	19¾

Norgren

THE MOST COMPLETE LINE OF AEROSOL BEARING LUBRICATORS



1/4 Pt. Oil Capacity	
Model	Bearing-inch Rating
30-40-2S	32
30-40-3S	32
1/2 Pt. Oil Capacity	
30-41-2S	32
30-41-3S	32



2 Qt. Oil Capacity	
Model	Bearing-inch Rating
S3408-2S	32
S3408-6S	200
S3408-8S	300

1 Qt. Oil Capacity	
Model	Bearing-inch Rating
S3406-2S	32
S3406-6S	200
S3406-8S	300



MICRO-FOG by Norgren



4 1/2 Gal. Oil Capacity	
Model	Bearing-inch Rating
Y3400-2S	32
Y3400-6S	200
Y3400-8S	300

1 3/4 Gal. Oil Capacity	
Model	Bearing-inch Rating
X3400-2S	32
X3400-6S	200
X3400-8S	300



2 Gal. Oil Capacity	
Model	Bearing-inch Rating
33AH-16	300
33AF-16	1000



BETTER LUBRICATION — Automatically, continuously applies finely divided air-borne oil fog.

One Lubricator Per Machine — A lubricator for every size job, 1000 bearing inches and less.

Oil Always Fresh, Clean — No recirculation of contaminated lubricant.

Big Savings in Equipment — Banishes pumps, reservoirs and filters. Fewer oil seals required; less seal maintenance. Manifolding provides equipment savings.

Lower Bearing Temperatures — Dissipates heat better, faster.

Visual Oil Feed — Indicates proper operation of lubricator.

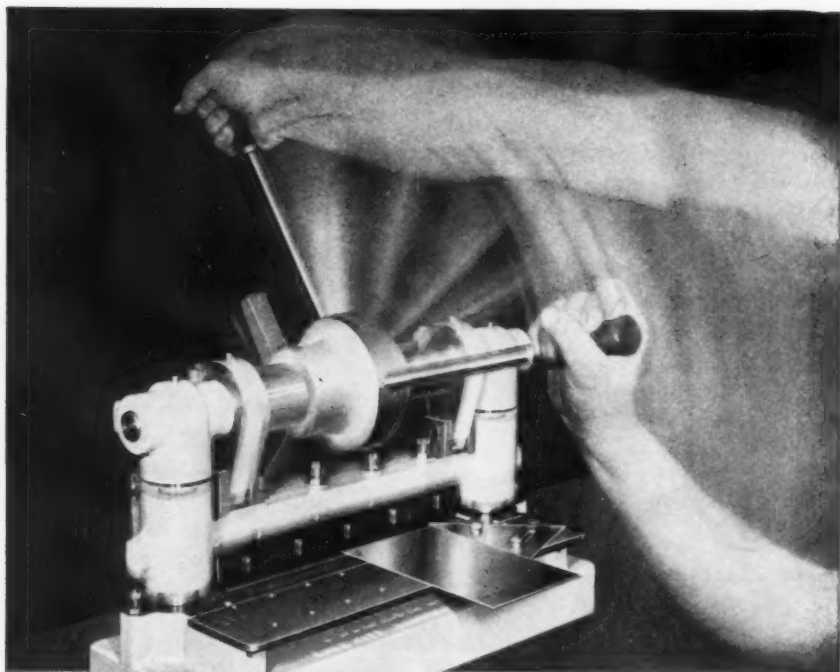
Oil-Saving — Every particle of oil does thorough lubricating job.

Call your nearby Norgren Representative listed in your telephone book—or WRITE FOR NEW CATALOG.

C. A. NORGREN CO.

3438 So. Elati St., Englewood, Colorado

Pioneer and Leader in Oil-Fog Lubrication Since 1930



Want **HIGH SPEED PRECISION SHEARING?**

Check These Features and You'll want a Versatile **DI-ACRO* SHEAR**

- **PRECISION**—strips less than .025" wide accurately sheared and duplicated.
- **CUTTING SPEED**—rivals power machines.
- **RATED CAPACITY**—16 gauge steel.
- **EASY TO OPERATE**—a woman can operate it with minimum effort.
- **CHOICE OF MODELS**—available in four sizes. Widths from 6 to 24 inches. Four power models.
- **ENGINEERING SERVICE**—always available.
- **PORTABLE**—readily moved about.
- **RUGGED**—backed by year warranty.
- **DELIVERY**—immediate on most models.
- **COST**—that's good too.

*pronounced Die-ack-ro



New catalog gives complete details or
See Di-Acro Exhibit, Booth 1410, National Metal
Exposition, Oct. 8-12, 1956, Cleveland Public
Auditorium, Cleveland, Ohio.



Creators of "DIE-LESS DUPLICATING"
O'NEIL-IRWIN MFG. COMPANY, 314 8th Ave., Lake City, Minn.

Circle No. 305 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

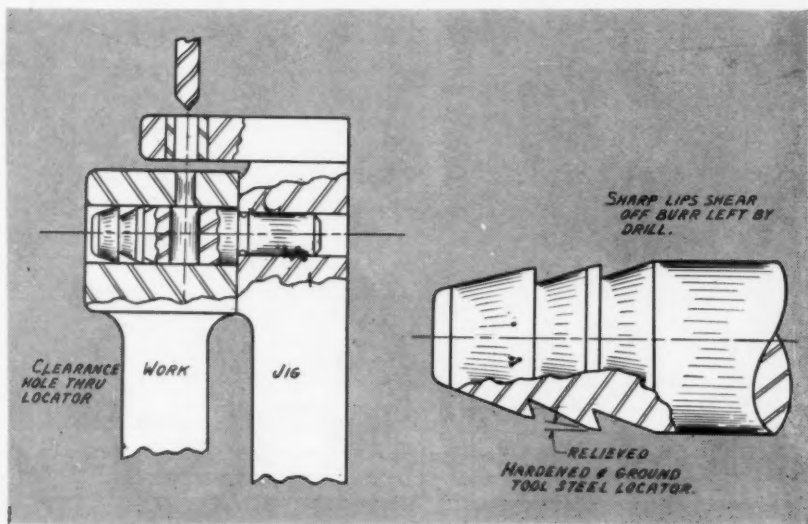
Special Locating Pin Deburs Work

by H. J. Gerber

A hole was drilled into a steel forging in a location where it intersected with another reamed hole. The drill invariably produced a burr in the second hole when it penetrated through into the clearance hole in the locator. This condition made it difficult to remove the work from the locator and also meant that a difficult deburring operation was required as the burr would be

forced back into the drilled hole when the part was removed from the jig.

The solution to this problem involved the design of a new locator. This locator was made from tool steel, hardened to about 62 Rc. Two annular shearing grooves were cut into this locator, as shown. These two undercut lips were relief ground to produce efficient cutting edges. When the part is stripped from the locator these cutting edges will shear off the burr. A twisting motion of the work during removal proved to be the most efficient means



HOW TWO ANNULAR SHEARING GROOVES were cut into locator.

Shop Hints

continued

of accomplishing this operation.

Compressed this way the drill made a clean cut of the material and we were able to do a number of pieces at one set up.

In operation we found it an advantage to knurl the cover for a hand grip during the drilling operation.

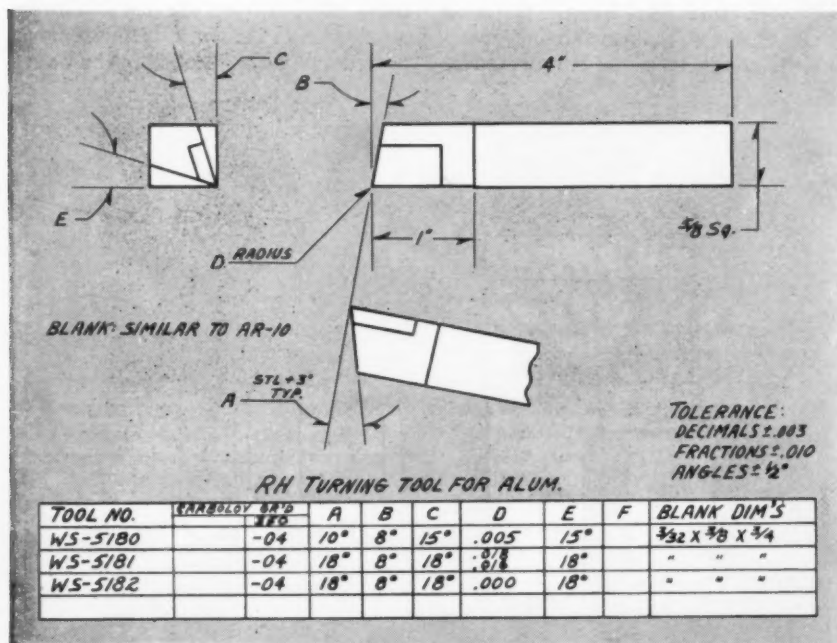
Aluminum Turning Tool

by Edward McIntyre

Illustrated is a straight right-hand carbide turning tool. Compared to a

tool in a standard catalog, its geometry is different. The tool will cut aluminum efficiently, will produce excellent finish with reasonable tool life per grind, whereas a standard catalog tool may not give equivalent performance; thus it sometimes becomes necessary to deviate from a standard tool style. It then pays to standardize to your own requirements and go to brazed construction.

Tabulating the tool geometry as shown will save time the next time you need a similar tool.



TURNING TOOL for aluminum with tabulation of tool geometry.

Diesel Fuel Injector Parts Get Precision Flatness, Finish and Parallelity on

Lapmasters®

... here's why and how

"John Crane" Lapmasters are taking over the highly critical and essential job of making diesel fuel injectors absolutely leak-proof—and doing it at a considerable reduction in cost over previous methods.

Both engine shops and injector manufacturers have found the Lapmaster a highly successful machine tool for obtaining the required flatness and finish on the mating surfaces of valve nozzle bodies, holders and spacers . . . have found they can run any combination of parts best suited to their production requirements . . . have reduced inspection and rework to the vanishing point.

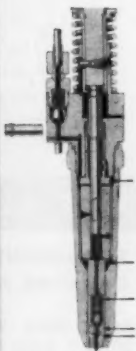
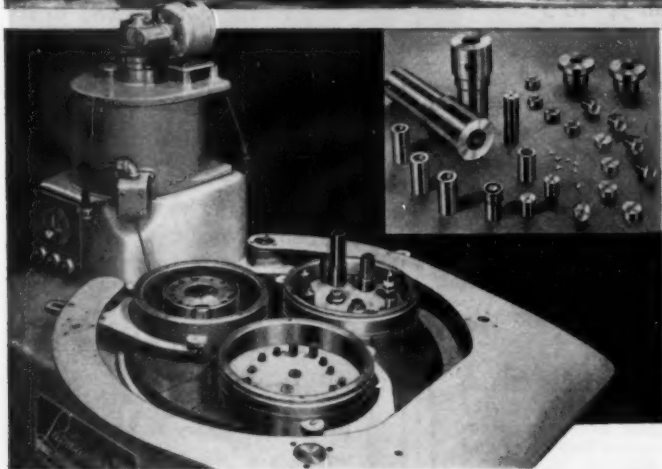
Lapmasters consistently produce flatness to less than one light band (11.6 millionth of an inch) surface finishes of 2 to 3 RMS on practically every kind of material including all ferrous metals, magnesium, aluminum, brass, carbon, ceramics and plastics.

There is a correct size Lapmaster for your requirement. Investigate the possibilities of this modern machine for your work.



FREE DATA

Send for these three booklets which describe in detail how to produce and measure precision flatness and finish.



ARROWS SHOW MATING SURFACES LAPPED



MECHANICAL PACKINGS



SHAFT SEALS



TEFLON PRODUCTS



LAPPING MACHINES



THREAD COMPOUNDS

CRANE PACKING COMPANY

6412 Oakton Street, Morton Grove, Illinois (Chicago Suburb) In Canada: 617 Parkdale Ave., Hamilton, Ontario



CUT A KEYWAY FOR ONE CENT

Using a Minute Man Keyway Broach Kit, you can cut keyways for as little as a penny a piece in just one minute. For keyways from $\frac{1}{16}$ " to 1" in any bore from $\frac{1}{4}$ " to 3".

Minute Man Broaches for square and hexagonal holes and *Production Type Keyway Broaches* are also available from stock at your Industrial Distributor's.

GET ALL THE DOPE

The duMONT CORPORATION
Greenfield, Mass.

MAIL FREE BROACH CATALOG AND PRICE LIST T describing Square Broaches, Hexagon Broaches, Production Type Keyway Broaches and Keyway Broach Kits to

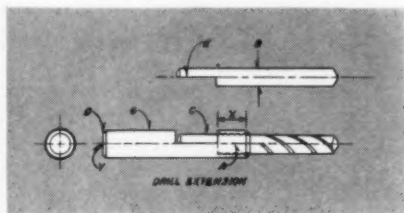
Name

Company

Address

Circle No. 307 on Card, Opposite Page 65

Salvage Worn Out and Broken Drill Ends



by Alex S. Arnott

This convenient extension for twist drills may be used to salvage short worn-out ends of drills, broken drills, or used to add length to a standard drill shank to reach hard-to-get-at work.

Use a plain piece of drill rod to make the extension. Bore hole (A) for snug fit for drill diameter (B) to the length (X). Cut slot (C) at right angles to the hole. Chamfer both ends of the extension.

Cut the drill as shown at (E). Both drill and extension have to be accurately ground to their centerlines, since inaccuracy will cause the drill to wobble in operation.

REPRINTS AVAILABLE

1. **What is the Smallest Radius that Can be Dressed with a Wheel Dresser?** by Henry F. Swenson.
2. **Where and How Can You Use Abrasive Rolls?** by Robert McAdams and James L. Erickson.
3. **Flexible Re-inforced Wheels** by Richard C. Bush.
4. **Flame Hardening** by M. R. Scott.

TEMPER, TEMPER!



If grinding wheel problems have you fighting mad, why horse around? Switch to CINCINNATI (PD)[®] WHEELS. For now CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement that can save you money . . . and increase your production.

Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel every time you re-order. Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

So, contact your CINCINNATI Grinding Wheels distributor. Or, contact us direct. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

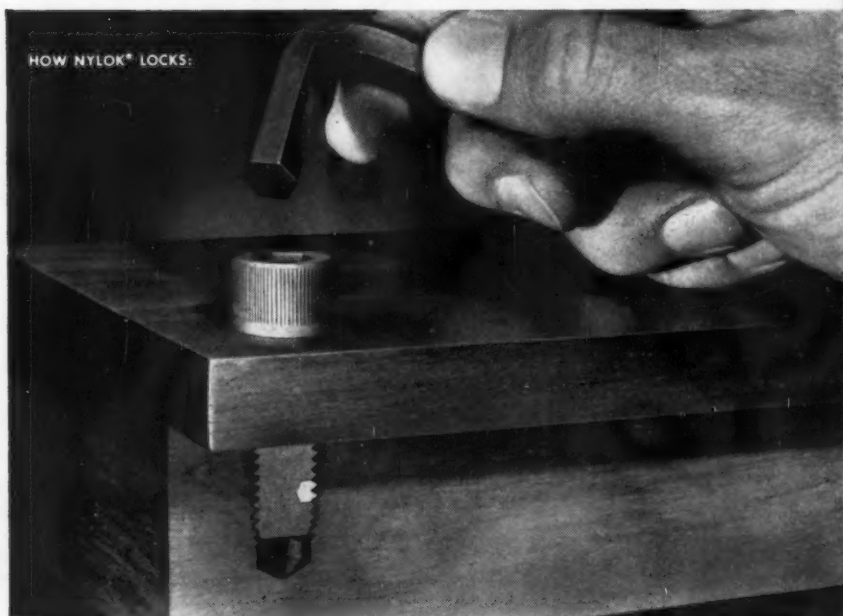
Remember—only CINCINNATI Grinding Wheels give you . . . **PD** POSITIVE DUPLICATION.

CINCINNATI[®]
Grinding Wheels

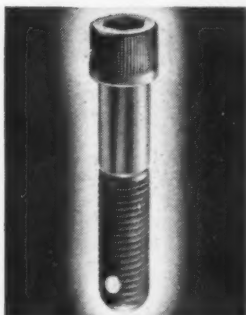
A PRODUCTION-PROVED PRODUCT OF
THE CINCINNATI MILLING MACHINE CO.

[®]Trade Mark Reg. U. S. Pat. Off.

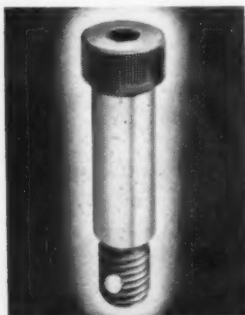
NEW—a complete line of socket screw products



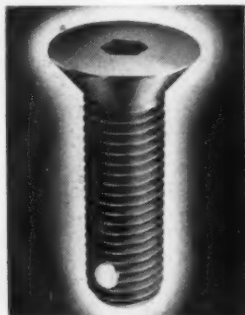
LOCKED! The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together, and locks the screw securely.



Socket head cap screws.
Standard sizes #6 to 1 in.



Socket shoulder screws.
Standard sizes 1/4 to 3/4 in.



Flat head socket screws.
Standard sizes #6 to 3/4 in.

self-locking UNBRAKO that won't work loose

They simplify design and save production time

UNBRAKO socket screws are now available embodying the Nylok* self-locking principle. Nylok provides a truly practical new solution to the problem of making screws self-locking.

An UNBRAKO screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching tops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not shake loose.

You save production time when you build products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly

wiring of cross drilled heads is eliminated. So are cotter pins and complex multiple set screw installations.

Self-locking UNBRAKOS are completely reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from -70° to 250° F. And, on properly seated screws, the pellet acts as a liquid seal.

Self-locking UNBRAKO socket screws come in a complete range of standard sizes and materials. See your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 52, Pa.

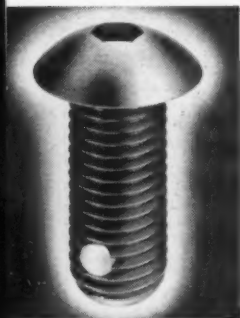
**T.M. Reg. U.S. Pat. Off., The Nylok Corporation*

STANDARD PRESSED STEEL CO.

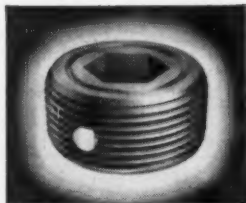
UNBRAKO SOCKET SCREW DIVISION

SPS

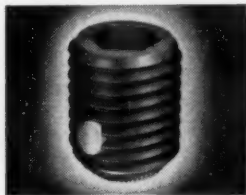
JENKINTOWN PENNSYLVANIA



Button head socket screws. Standard sizes #6 to $\frac{3}{8}$ in.



Socket pressure plugs. Standard sizes $\frac{1}{8}$ to $1\frac{1}{4}$ in.

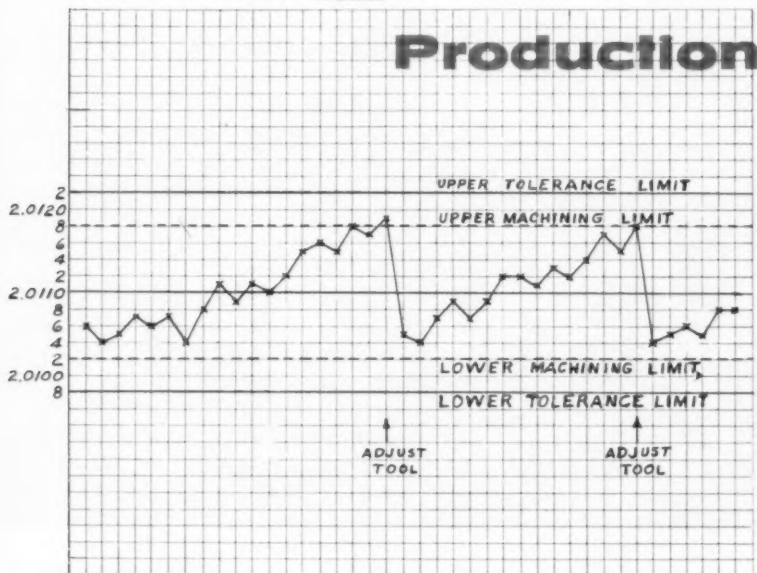


Socket set screws. All standard point types. #6 to 1 in.

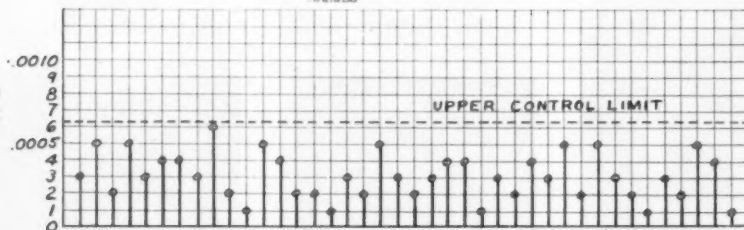
QUALITY CONTROL
Warner & Swasey Co.

Plant	Dept.	Mach. No.	Part Name	Part Number	Lot No.
1	44	49	BUSHING BLANK	1004-10	108
Sample No.	Check For	Size	Limit	Frequency	Date
7			2.011 \pm .0012 O.D.	5 PER 100	1-20-56

AVERAGES



RANGES



W & S 2524-15

By **Sterling F. Winchell**
Chief Quality Control Engineer
Warner & Swasey Company

Quality Control Charts

They ascertain capability and performance of machines and operators and help Warner & Swasey maintain consistently high accuracy in machining small lot precision parts

● It is well known that the accuracy of a finished workpiece is influenced by the accuracy of the machine tool on which it is produced. In general practice, however, the probability of obtaining satisfactory work output at an acceptable accuracy level usually is a function of the composite of a group of machines and operators—any combination of which could be utilized in producing the desired parts.

The problem is determining exactly which combination of machines and operators is, from an accuracy standpoint, best suited for production of a given type of part, so that the workpieces in the shop can be routed accordingly.

If proper routing can be accomplished, the probability of holding narrow tolerance limits will be substantially increased.

To obtain the information necessary for this type of machine and operator selection and subsequent workpiece routing, the company, using standard production sampling techniques, charts a running graph record of the repeat accuracy range obtained on each of its machines during operation, thus securing a precise, easily read index of individual machine and operator quality results.

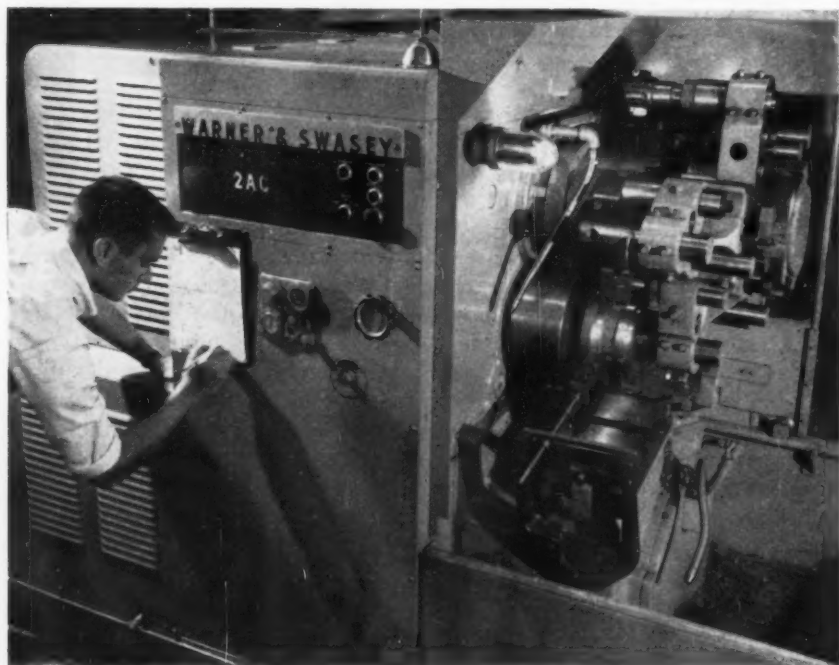
This information, states Warner & Swasey, not only serves as the basis for determining the class of work to assign each machine, but also is a valuable guide to the ma-

chine's maintenance and replacement requirements. Any gradual change in accuracy can be detected and an investigation begun to find the cause. If the machine actually is found to be at fault, production is halted and corrective action taken before any pieces outside established tolerance limits are produced.

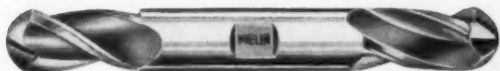
As an additional aid to the operator, each control chart also presents a continuous record of current machining performance.

The operator can appraise his own work and compensate with immediate cutting tool adjustments for any trends toward out-of-tolerance production. The charts are kept in full view at each machine.

Since the accuracy range of every machine tool is clearly indicated by the control charts, it is pointed out, the operator is constantly aware that any machining errors outside specified limits are clearly his own responsibility—an excellent psychological influence! . . .



INSPECTOR CHARTS A RUNNING GRAPH RECORD of the repeat accuracy range obtained on a 2AC machine engaged in small lot production. The graph record, which is based on standard production sampling techniques, serves as the basis for determining the class of work to assign the machine and also is a guide to the machine's maintenance and replacement requirements.



MELIN END MILLS



Representatives in principal cities.



**MELIN TOOL
COMPANY, INC.**

3374 West 140th Street
Cleveland 11, Ohio



There is a difference
in end mills . . .
MELIN end mills!
Proof of this
is evident in the
continued increase
in **MELIN** popularity.
The growth in
MELIN tool acceptance
was by no means an
accident
. . . The secret
is in **CONSISTENT
QUALITY**. This
standard of Quality
assures you better
performance . . .
longer lasting
performance . . .
CONTINUOUSLY . . .
from one shipment to
another.
Next time you order
end mills . . .
specify the finest . . .
specify **MELIN**.

**MANUFACTURED IN
TWO, THREE AND FOUR
FLUTE TYPES.**

Automatic Machining of

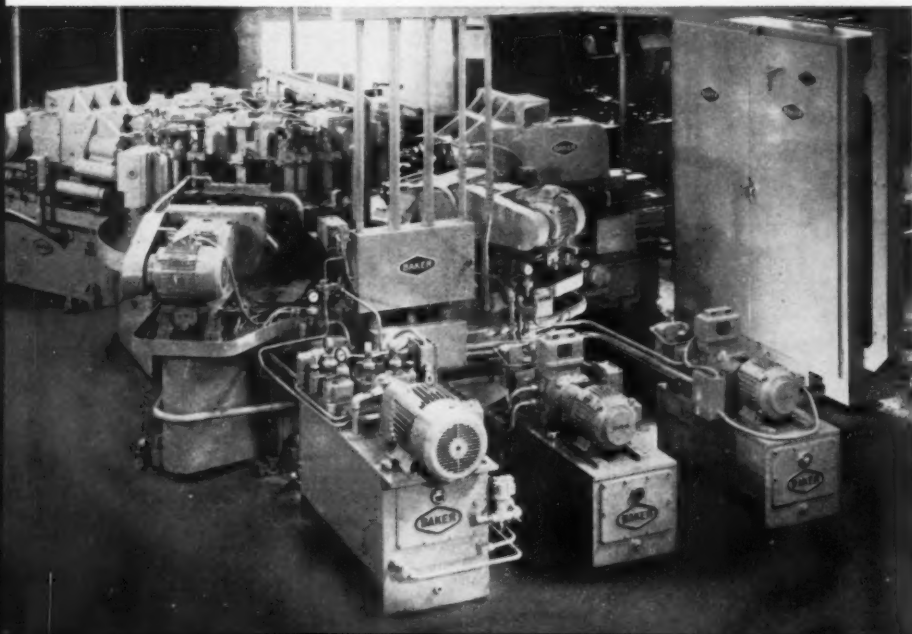
Jet Nozzle Bits

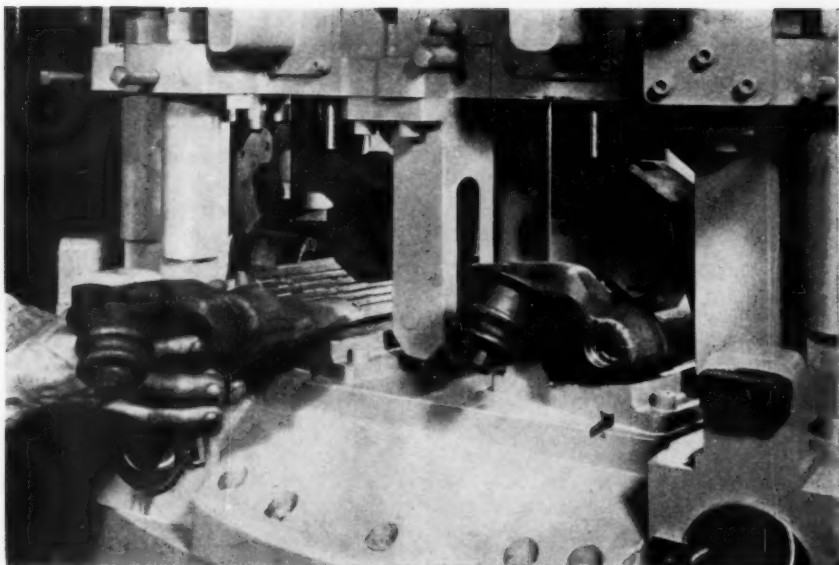
● This new multiple operation index table machine was built by Baker Brothers, Inc., Toledo 10, Ohio to finish jet nozzle bits. The finished part functions as a bracket to hold one of the cutting heads on an oil well rock drill.

Consisting of 5 stations, the

Baker machine's operations are: load two parts, center drill, drill, counterbore, ream and recess. Each fixture holds two parts, and identical operations on the two parts are performed at every station. The production rate is 123 parts per hour at 100%.

UNMACHINED PART (left) . . . and the completed jet nozzle bit (clamped, at right). 123 parts per hour is the production rate for this machine.





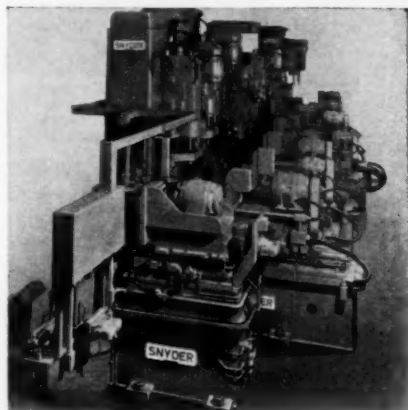
OPERATIONS PERFORMED by this 5-station index table machine are: load two parts, center drill, drill, counterbore, ream and recess.

While specially designed to produce these jet nozzle bits, this index machine is composed of Baker Basics—versatile hydraulically operated *standard* machines that can be retooled for changes in product or production methods. • • •

Transfer Machine for Cast Iron Oil Pump Bodies

New 84-station segmented transfer machine that machines, washes and air tests cast iron automotive oil pump bodies at a rate of 103 pieces per hour at 75 percent efficiency has been designed and built by Snyder Tool & Engineering Co., Detroit. Machine features a unique parts distribution system that feeds finish-machined, tested parts to

three conventional precision boring ma-



New Snyder segmented transfer machine machines, washes and tests cast iron oil pump bodies and feeds them to each of three precision boring machines according to individual machine demand.

chines according to demand.

A wide variety of drilling, milling, reaming, tapping, trepanning, boring, spotfacing, countersinking and chamfering operations are performed in the first 12 segments and 43 stations of the machine.

Probing devices at certain stations shut down the machine if tap drilled holes are incomplete.

Parts are washed in segment 13 and then air-tested in segment fourteen.

Like other Snyder transfer machines, the new machine has individual segments, each having individual bases and control panels to simplify machine construction, maintenance and part design change problems.



Multiple Spindle Magazine Feed Power Screw Driving Machines

Latest type equipment for driving screws faster in products requiring two or more screws. These machines operate easily and require very little attention or adjustment once they are put in production.

Part Feeder

Model C Automatic Part Feeders provide an efficient means of feeding parts to Automatic Machinery. They are fast feeding, have large storage capacity and are easy to load.

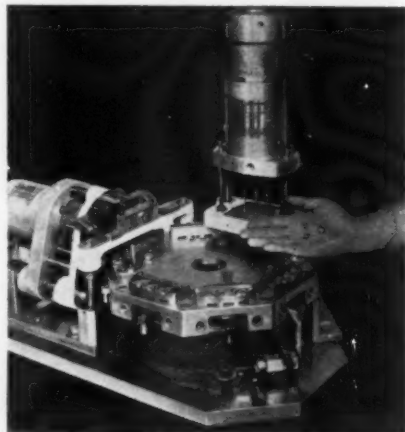
Pat. applied for.



COOK & CHICK CO.
2415 WEST 24th ST.
CHICAGO 8, ILLINOIS

Small Holes Drilled Simultaneously

The part is called a detent for a Navy fuse and is roughly the size of one's fingernail. A special but inexpensive eight-station rotary indexing table facilitates the use of standard drilling and reaming heads. Two gearless multiple-spindle drill heads are used: One vertically mounted to ream two holes, and one horizontally mounted to drill a hole in the side of the detent.



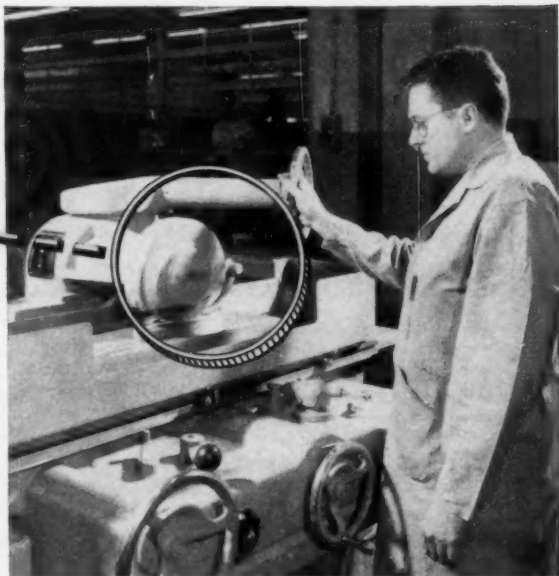
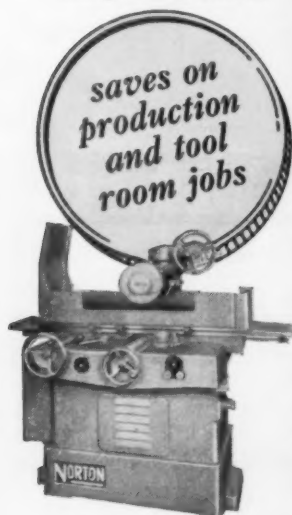
Three pieces are held in each of eight stations, and the holes are drilled simultaneously in three pieces. The two holes through the part are on 5/16" centers and are 1/16" and 3/32" in diameter. The side hole, a No. 55 (.052) diameter drill through a 1/16" section, is drilled from another station at the same time.

Six stations are always open for loading, cleaning, and unloading. Loading is manual. Progressive indexing and ejection are automatic. Production is rated at 1200 pcs. per hour.

Circle No. 311 on Card, Opposite Page 65

Easy to set up... Easy to operate...

*This Norton 8"
Surface Grinder*



Here's a rugged machine that sets up quickly for production runs and maintains steady accuracy on small parts. And it's just as efficient for grinding a variety of small units in tool room work.

Designed with both hand and hydraulic table traverse and cross feed, the Norton 8" x 24" hydraulic surface grinder produces plane surfaces smoothly and speedily. Convenient controls and easy accessibility keep operating and maintenance time low — while the quick, easy set-ups cut your unit costs on job after job.

Write for Catalog 190 on this popular, money-saving Norton surface grinder, or for literature on its 6" and 10" companion

models. And remember — only Norton offers you such long experience in both grinding wheels and machines to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.

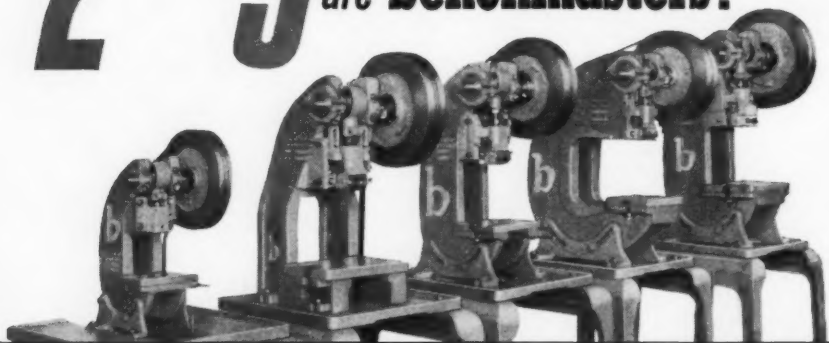
To Economize, Modernize With NEW



Making better products... to make other products better

District Sales Offices: Worcester • Hartford
New York • Cleveland • Chicago • Detroit

2 out of 3 small presses purchased are benchmasters!



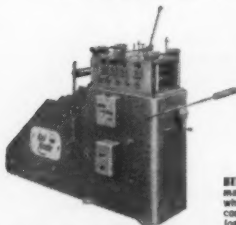
That's a fact... out of all small punch presses purchased 2 out of 3 are supplied by Benchmaster!

Being first choice by so wide a margin is no accident. First, Benchmaster builds small presses in 3 distinct capacity ranges... 2, 5 and 8 tons. Second, consider the various models available... plain inclinable models, backgeared types, deep throat presses, fixed bed gap frame types, half presses, multiple ram presses and special stroke models!

Add to this the complete range of Benchmaster Accessories... AUTOMATIC DIAL INDEX FEEDS, AUTOMATIC FRICTION ROLL FEEDS, ROLL STRAIGHTENERS, KOIL KRADLES, BARRIER TYPE GUARDS, CHUTE TYPE PRODUCTION PANS, ETC. And remember, Benchmaster's acceptance is world-wide—wherever you go there's a Benchmaster—and Benchmaster service!

When buying new presses choose the winner... First in Sales, First in Quality, First in Economy!

**Wherever there's a press operation,
this Benchmaster Equipment
will cut costs, save time!**

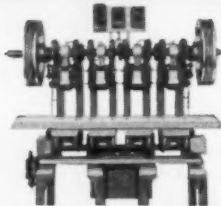


BENCHMASTER KOIL KRADLES—Automatically supplies a slack loop from which any machine can draw. Overcomes inertia of heavy coils—easier loading. Many sizes. Ask for data.

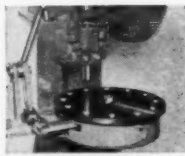
BENCHMASTER STRAIGHTENERS—(Shown in combination with Roll Kradle.) Adjustable, power driven rolls; removes kinks—straightens out coil stock before feeding to feed mechanisms or to press. Many sizes, write for details.



BENCHMASTER AUTOMATIC FRICTION ROLL FEEDS—A low cost roll feed made especially for all small presses. Has automatic roll lifters, feeds almost any material. Two models: 0-3" and 0-6" cutoff. 3, 5, 7 and 9" roll widths.



BENCHMASTER MULTIPLE RAM PRESSES—Any number of units required—rams can operate in unison, can alternate or can be staggered... all operate on same crankshaft... stroke lengths can also vary on each ram... separate die stages on each bed cut tooling costs, permit quick replacements. Costs $\frac{1}{2}$ to $\frac{1}{3}$ of large presses doing similar work; doubles production!



BENCHMASTER DIAL INDEX FEEDS—Links with ram, automatically indexes, placing new station under ram with each stroke. Up to 6000 strokes per hour. Cuts labor—makes your press operations almost automatic. 12" or 15" diameter tables, up to 24 stations.

FREE BENCHMASTER CATALOG! Write today!

benchmaster

World's largest
manufacturer of small punch
presses and mills.

1835 W. Rosecrans Avenue, Gardena, California

Circle No. 313 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

FREE LITERATURE

MACHINE AND TOOL

blue book

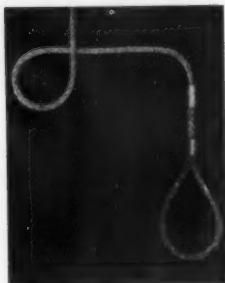
(see Number 1.)



(see Number 2.)



(see Number 3.)



1. Indexing Chassis. Swanson Tool & Machine Products, Inc. Bulletin 356-5M describes standard indexing machine chassis, offered in over 200 models to suit requirements for special purpose automatic machines.

2. Turret Lathes. Gisholt Machine Co., Madison 10, Wis. Bulletin 1174-B, describes 3 models of new Masterline ram type universal turret lathes with increased power and higher spindle speeds.

3. Wire Rope Slings. American Chain & Cable Co., Inc., Wire Rope Sling Dept., Wilkes-Barre, Pa. Bulletin DH-532A features ACCO registered Cable-Laid Slings that offer flexibility, strength and kink-free construction.

4. Disc Sanders and Grinders. Max Mfg. Co., 138 Stockton Ave., San Jose 26, Cal. Ten models of single and double disc machines in sizes 16", 20", 24", 30" and 36" are featured in folder 56-1.

5. Marking Machine. Jas. H. Matthews & Co., Inc., 3942 Forbes St., Pittsburgh 13, Pa. Matthews No. 201 rotary table marking machine is a high-speed unit for marking cylindrical and cone-shaped parts.

6. Gages. H. E. Morse Co., Holland, Mich. Featured is the complete line of Hemco gages, including, Cylindrical plug and ring, plug thread, ring thread, thread setting, pipe thread, master setting discs, thread measuring wires and special type gages.

7. Barrel Finishing. Oakite Products, Inc., 157 Rector St., New York 6, N.Y. Folder describes barrel finishing methods and materials from pre-cleaning stage to the final rinse.

8. Carbide Dies. Oberg Mfg. Co., Inc., Tarentum, Pa. Booklet illustrates and explains how Oberg's experience can help solve tooling-up problems when high production, critical tolerances and quality are at stake.

9. Centerless Polishing. Production Machine Co., Greenfield, Mass. Bulletin 9-5M-55 features the Type A centerless polishing machine for polishing, finishing, buffing and sanding of rods, bars and tubes.

10. Punching Units. Punch Products Corp., 3800 Highland Ave., Niagara Falls, N.Y. Catalog describes Uni-punch hole-punching and notching units, for punching and notching sheets and angles up to 1/4" thick.

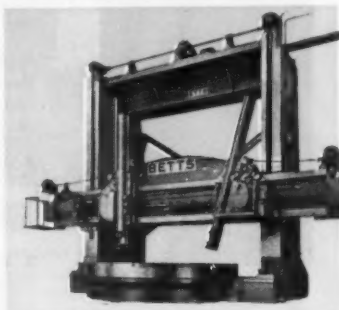
Consolidated heavy-duty

Consolidated Machine Tool Division builds some of the world's largest precision metalworking machines. Heavy-duty lathes, for example, that swing twelve feet over the ways, handle work up to sixty feet long and will turn, on centers alone, forgings that weigh up to 250 tons.

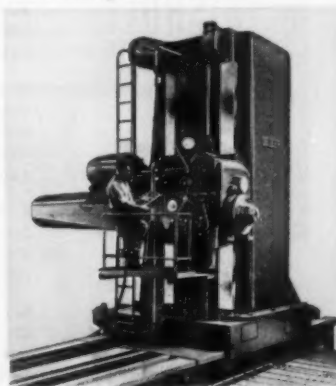
In addition, Consolidated builds more types of machine tools than any other builder in the United States.

It will pay you to get acquainted with Consolidated. Detailed information on the products listed is available upon request.

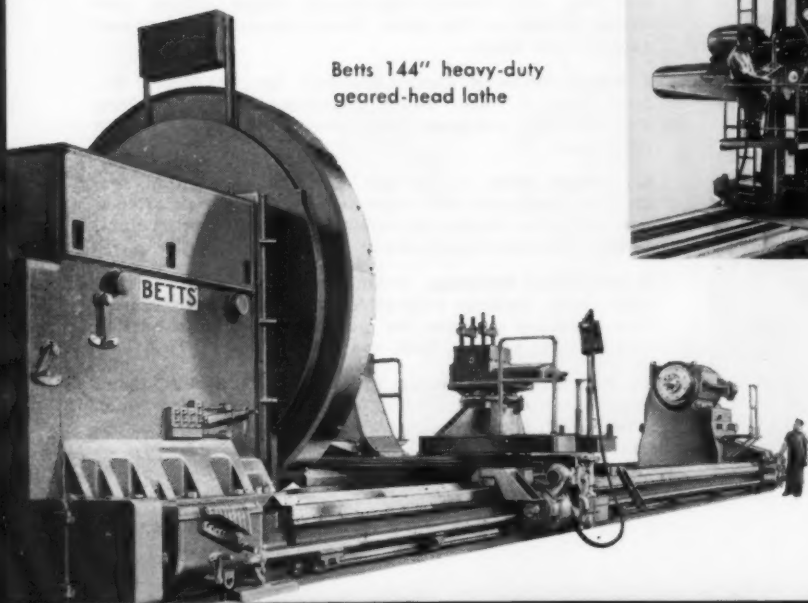
Betts 20' vertical boring and turning mill



8" bar, horizontal, boring, drilling and milling machine

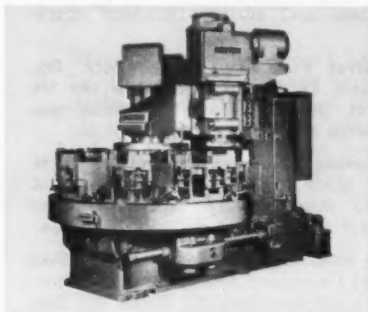


Betts 144" heavy-duty geared-head lathe



machine tools

Newton vertical rotary
milling machine



CONSOLIDATED MACHINE TOOLS

Engine Lathes
Vertical Boring and Turning Mills
Floor and Planer-Type Horizontals
Planers, Double Housing and Openside
Planer-Type Milling Machines
Plate Edge Planers
Vertical Slotters
Rotary and Straight-Line, Production-Type
Milling Machines
Skin Mills for Aircraft Manufacturing
Circular Cold Saws
Railroad Wheel and Axle Machinery
Special Machine Tools

CONSOLIDATED MACHINE TOOL DIVISION

FARREL-BIRMINGHAM COMPANY, INC.

Rochester 10, N. Y.

Betts 100" worm-and-rack-
driven slotter, 30 feet high,
140 tons



Free Literature

continued

11. Feeds and Speeds Chart. Chicago-Latrobe, 411 W. Ontario St., Chicago 10, Ill. Available is a safe feeds and speeds chart for high speed drills for use in cast iron, bronze or brass and drop forgings, alloy steel or tool steel.

12. Rivets. Chicago Rivet & Machine Co., 950 S. 25th Ave., Bellwood, Ill. Included are descriptions of 1388 semi-tubular, full-tubular and split rivets, bag studs and rivet caps.

13. Presses. Danly Machine Specialties, Inc., 2100 S. Laramie, Chicago 50, Ill. Catalog features single, double and triple action underdrive presses with capacities from 400 to 2000 tons.

14. Industrial Brushes. Pittsburgh Plate Glass Co., Baltimore 29, Md. Twelve examples how Pittsburgh industrial brushes saved money for industry are featured.

15. Cup Guards. Morrison Products, Inc., 16816 Waterloo Rd., Cleveland 10, O. Dimensions and sizes of both flaring and straight revolving cup guards are shown.

16. Holding Tools. Montgomery Tools, 7 Tichenor Lane, Newark 5, N.J. Bulletin contains 8 different holding tools for use on surface grinders.

17. Diamond Tools. National Diamond Laboratory, 108 Fulton St., New York 38, N.Y. Catalog contains rough diamonds,

diamond wheels, hones and diamond powder.

18. Steel Tubing. Jos. T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill. Buyers' and designers' guide to specially processed steel tubing and cold finished steel bars for cylinders and fluid lines.

19. Grinding Centers. Ready Tool Co., 554 Iranistan Ave., Bridgeport, Conn. New Red-E grinding concept is claimed to overcome chatter, wheel marks, out-of-roundness, and costly secondary operations.

20. Barrel Finishing. Rampe Mfg. Co., Cleveland, O. Bulletin describes the V8, 8 cu. ft. precision barrel finishing machine with 1 to 4 compartments.

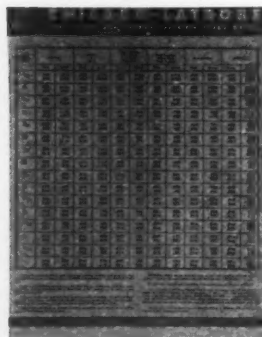
21. Bonding Cement. Sheridan Products, 1054 E. Hyde Park Blvd., Inglewood, Cal. Bulletin describes BK No. 7, bonding agent for retaining of drill jig bushings.

22. Die Filer. Sales Service Machine Tool Co., 2363 University Ave., St. Paul 14, Minn. Bulletin 256 describes the Keller die filer available in three models.

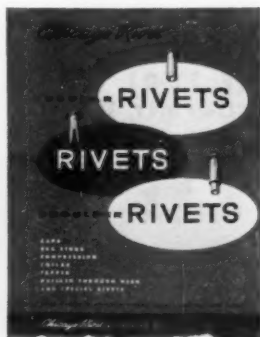
23. Holding Tools. Seibert & Sons, Inc., Chenoa, Ill. Described are slip spindle assemblies, drill and tap drivers, spindle extension assemblies, adapters and turret tool holders.

24. Carbide Catalog. Coromant Div., Sandvik Steel, Inc., 1702 Nevins Rd., Fair Lawn, N.J. Catalog covers complete line of Coromant carbide tool products including inserts, blanks and tools.

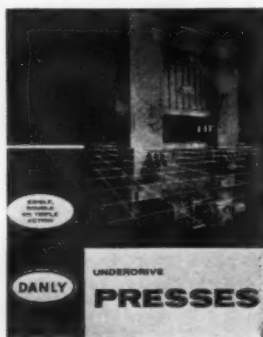
(see Number 11.)



(see Number 12.)

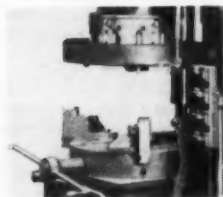
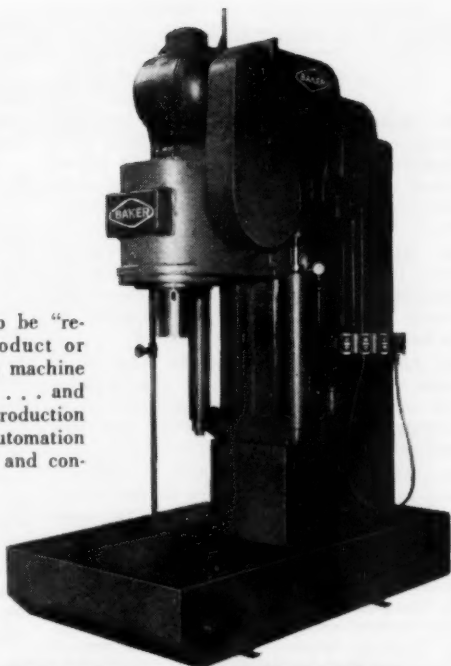


(see Number 13.)

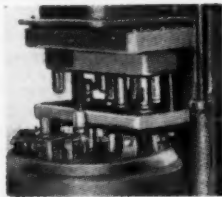


AUTOMATION THAT'S EASILY RETOOLED FOR CHANGES

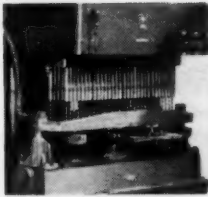
Baker Basic machines don't have to be "re-built" when you change your product or methods . . . cost much less than a machine specially designed for only one part . . . and pay for themselves even on lower production runs. Yet they still give you full automation with loading and unloading devices and conveyors . . . which we'll furnish as well as tooling. Use singly or in battery as a transfer machine . . . for drilling, boring, tapping, facing and other machining operations. 5 sizes.



Boring



**Drilling and reaming
with index fixture**



Multiple drilling



....Mail Coupon Today....

**BAKER BROTHERS, INC. Dept. MT-1056
Toledo 10, Ohio**

Please send free Catalog on Baker Basics
and automation with standard machines.

NAME AND TITLE

COMPANY

ADDRESS

CITY

ZONE

STATE

Free Literature

continued

25. Deburring & Chamfering. Cogsdill Tool Products, Inc., 12980 W. 8 Mile Rd., Oak Park 37, Mich. Booklet features Burr-Away and BurraMatic deburring and chamfering tools, plus various applications.

26. Boring Machines. Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. Booklet pictures its improved method for finish machining holes from the solid. It is known as the Bor-Drill method.

27. "Abrasive Cutting" is the title of a new booklet available from The Allison Co., of Bridgeport, Conn. Included is a general recommendations chart for the selection of Allison abrasive wheels.

28. Floor Absorbent. Speedi-Dri Corp., Menlo Park, N.J. Literature shows 75 industrial uses of Sol-Speedi-Dri, a mineral floor absorbent for home and office.

29. Air Hammer. Superior Pneumatic and Mfg., Inc., 4758 Warner Rd., Cleveland 25, O. The Bantam Bully delivers 13,000 blows per minute and provides for every type of impact, either feather touch or a smashing blow as needed.

30. Jig and Fixture Components. Standard Parts Co., 1000 Broadway, Bedford, O. New catalog features more than 500 standard jig and fixture components available.

31. Carbide Drills. Star Cutter Co., 34500 Grand River Ave., Farmington, Mich. Starbore carbide drills that produce preci-

sion holes from the solid are featured.

32. Live Centers. Sturdimatic Tool Co., 3932 F St., Detroit 16, Mich. Specifications and prices of the standards which are made with Morse taper and include three types of specials are described.

33. Tool Holders. Scully-Jones and Co., 1901 S. Rockwell St., Chicago 8, Ill. Bulletin 7-50 describes sleeves and sockets and turret tool holders.

34. Lubricants. Sun Oil Co., Philadelphia 3, Pa. Bulletin 44 tells how to clean sludge out of hydraulic and lubrication systems with Sunvis 700 oils.

35. Pedestal Grinder. South Bend Lathe Works, 425 E. Madison St., South Bend 22, Ind. Literature describes an entirely new concept in pedestal grinding.

36. Radial Relieving Attachment. Spati Industries, Inc., P. O. Box 501, Covington, Ky. Literature describes an entirely new concept in radial relief grinding.

37. Test Indicator. Standard Gage Co., Inc., Poughkeepsie, N.Y. Literature features the Check-Master test indicator for setting up work on a surface plate and the truing of pieces in machine tools.

38. Flexible Shafting. Stow Mfg. Co., 30 Shear St., Binghamton, N.Y. Bulletin 570 furnishes information on all sizes of shafting from $\frac{1}{8}$ " to $1\frac{1}{2}$ " in dia.

39. Power Presses. Sales Service Machine Tool Co., 2363 University Ave., St. Paul 14, Minn. Bulletin 955 features the Press-Rite Juniorline of power presses.

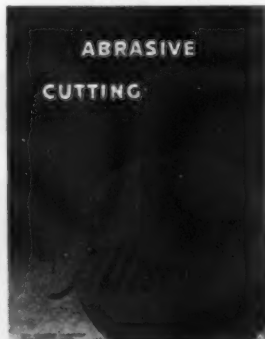
(see Number 25.)



(see Number 26.)



(see Number 27.)



PRODUCTION

"at all time Peak"

Solar Aircraft Company of Des Moines, Iowa and San Diego, California, has found the versatility and flexibility of the Bullard Man-Au-Trol V.T.L., Model 75 a distinct advantage in the machining and fabricating of various jet aircraft engine parts and assemblies.

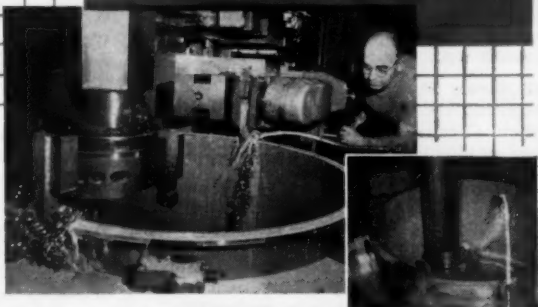
with

BULLARD

MAN-AU-TROL

VERTICAL TURRET LATHE

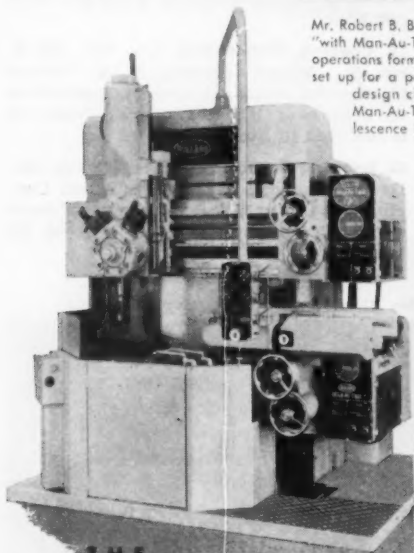
MODEL 75



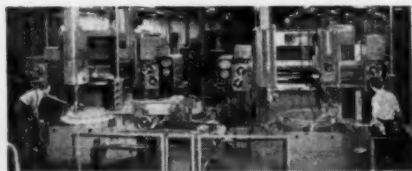
Mr. Robert B. Ballard, Production Manager at Solar-Des Moines, reports that "with Man-Au-Trol, Model 75, it is possible to do a multitude of machining operations formerly requiring numerous expensive machines which had to be set up for a particular operation, so limited in scope, that an engineering design change either obsoleted the tooling or the machine. With Man-Au-Trol, Model 75, because of its wide range of functions, this obsolescence is greatly reduced — if there is a design change, only a new set-up is made — not the purchase of a new multi-thousand dollar piece of machinery."

These same advantages can be applied to your manufacturing methods —

Ask your Bullard Sales Engineer for complete details.



**THE
BULLARD COMPANY**
BRIDGEPORT 9,
CONNECTICUT



THE BULLARD COMPANY

286 CANFIELD AVENUE • BRIDGEPORT 9, CONNECTICUT

Please send me a copy of the

NEW MAN-AU-TROL V.T.L., MODEL 75 CATALOG

NAME

COMPANY POSITION

ADDRESS

CITY ZONE STATE

Free Literature

continued

40. Surface Grinder. Abrasive Machine Tool Co., Dexter Rd., East Providence 14, R.I. The new No. 618 hand feed precision surface grinder is featured in bulletin.

41. Presses. E. W. Bliss Co., 1375 Raff Rd. S. W., Canton, O. Catalog 3 features double crank inclinable presses, including a newly designed line of enclosed double cranks with box-type crowns.

42. Screw Machines. The Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Mich. Catalog describes the latest design and production advances in single spindle bar automatic screw machines.

43. Washers. Standard Pressed Steel Co., Jenkintown, Pa. The new PLI-Washer consists of two concentric steel rings sandwiched between two close tolerance washers. Controls tightening of connections and permits accurate preloading.

44. Collets. Sutton Tool Co., Sturgis, Mich. Collets for lathes, milling machines and grinders are featured in bulletin 10. Prices and specifications given.

45. Portable Tools. Skil Corp., 5033 Elston Ave., Chicago 30, Ill. New 1956 catalog contains the complete line of portable power tools and accessories.

46. Rivets. Townsend Co., P.O. Box 237-Z, New Brighton, Pa. A versatile new blind

rivet, the Versa-Rivet is described with specifications and design details.

47. Air Gage. The Taft-Peirce Mfg. Co., Woonsocket, R.I. Folder deals with automatic gaging as applied to automation operations, and points out semi-automatic and manual applications.

48. Sawing Machines. Ty-Sa-Man Machine Co., 1016 White Ave., Knoxville, Tenn. Brochure features friction, abrasive, cut-off and long cut sawing machines.

49. Dust Collectors. Torit Mfg. Co., 287 Walnut St., St. Paul 2, Minn. Catalog 39 describes complete line of cabinet cloth filters and cyclone separator type dust collectors.

50. Measuring Instruments. Tubular Micrometer Co., St. James, Minn. Catalog 22 features the complete line of Tumico precision measuring instruments.

51. Parts Feeder. U. S. Engineering Co., 40-24 22nd St., Long Island City 1, N.Y. Described is the Feed-A-Matic, for feeding, orienting and counting up to 200,000 items per hour.

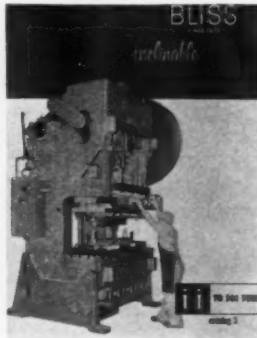
52. Coolant. Vitene Mfg. Co., Inc., 230 E. 8th St., Mount Vernon, N. Y. Vytron transparent chemical coolant, containing no petroleum, mineral, or vegetable oils is featured in literature.

53. Lapping Service. The Van Keuren Co., 176 Waltham St., Watertown, Mass. Lapping service for flat and cylindrical work in metals and non-metals is offered by Van Keuren Co.

(see Number 40.)



(see Number 41.)



(see Number 42.)



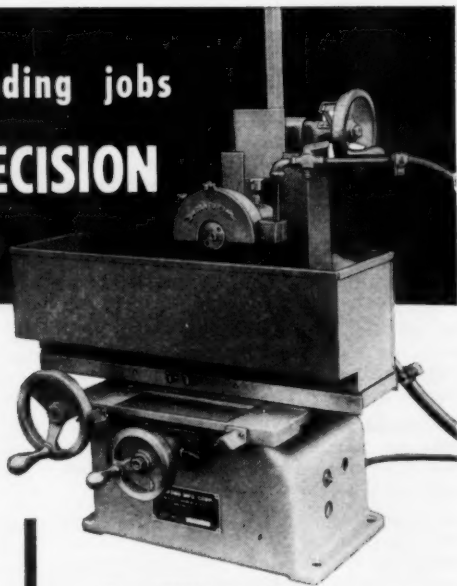
to do small grinding jobs
to **MICRO-PRECISION**
FAST...

**you need
the
SANFORD
Model SG
SURFACE GRINDER**

This unrivalled small parts grinder can be depended upon for micro accuracy. It's easy to use too . . . every hand wheel and operating switch is at your finger tips.

Designed and built by engineers and tool makers of rare foresight for tool, die and gage work, it has been constantly preferred after these many years of proven worth.

Write for fully illustrated literature, replacement parts and special attachments data with price list.



**For WET or DRY
grinding, specify
optional equipment.**

PARTIAL SPECIFICATIONS —

Chuck Surface—3" x 5" or 4" x 6".
Table travel—8", traverse 4".
Vertical head movement—6".
Work area under 4" wheel—6",
with chuck—4".
Standard grinding wheel—
4" x 3/8" x 1/2".
Spindle speed—approx. 5500 RPM.
Motor, 1/6 HP, single or 3 ph.,
dynamically balanced.
Dimensions—23" x 30" x 27" high.
Net wt. approx. 160 lbs.

Representatives in major industrial areas

SANFORD

MANUFACTURING CORP.

1026 Commerce Ave., Union, N. J.

Free Literature

continued

54. Forming Machines. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N.Y. Bulletin 77 features new line of slip roll forming machines.

55. Tracer Milling Unit. Sundstrand Machine Tool Co., 2531 11th St., Rockford, Ill. Circular describes the new 3 dimension tracer milling unit.

56. Optical Comparator Charts. Jones & Lamson Machine Co., Springfield, Vt. Catalog 403 describes the complete line of charts available for optical comparators.

57. Liquid Honing. Vapor Blast Mfg. Co., 3025 W. Atkinson Ave., Milwaukee 16, Wis. Literature describes the Vapor Blast method of liquid honing.

58. Clamps. Wetzler Clamp Co., 43-15 11th St., Long Island City 1, N.Y. A wide assortment of clamps and clamping devices are described and illustrated.

59. Blast Abrasive. Wheelabrator Corp., 1169 S. Byrkit St., Mishawaka, Ind. Literature describes new steel grit blast cleaning abrasive called Steeleetts.

60. Hand Feed Threaders. Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. Circular 931-A-2 covers the complete line of hand feed threaders.

61. Tap Guide Wall Chart. The Wood & Spencer Co., 1930 E. 61st St., Cleveland 3,

O. Twelve comprehensive quick-reference tables are arranged in calendar style.

62. Turret Press. Wiedemann Machine Co., Dept. 254, 4272 Wissahickon Ave., Philadelphia 32, Pa. Bulletin 242 describes new RA-4P turret punch press for punching holes in printed wiring boards.

63. End Mills. Weldon Tool Co., 3000 Woodhill Rd., Cleveland 4, O. Catalog contains complete line of end mills, holders, counterbores, countersinks, deburring tools, angular cutters, sharpening fixtures and high speed steel form tools.

64. Grinding Spindle. Columbia International Corp., 10-35 44th Dr., Long Island City 1, N.Y. The Wagner contact roller spindle for high speed internal grinding.

65. Tool Grinder. Wesson Co., 1220 Woodward Heights Blvd., Detroit 20, Mich. Featured is the Poweramic oscillating tool grinder for off-hand grinding.

66. Template Sheets. West Point Mfg. Co., 26935 W. 7 Mi. Rd., Detroit 19, Mich. Featured are $\frac{1}{4}$ and $\frac{1}{2}$ scale template sheets for all Wespo toggle clamps.

67. Diamond Wheels. Allstate Diamond Products, 80-82 Bowery, New York 13, N.Y. Catalog contains complete line of diamond wheels and hones and includes specifications for ordering.

68. Simplified Drafting. American Machine & Foundry Co., 261 Madison Ave., New York 16, N.Y. A 56-page booklet is devoted to the details of AMF standards on drafting room practice and simplified drafting.

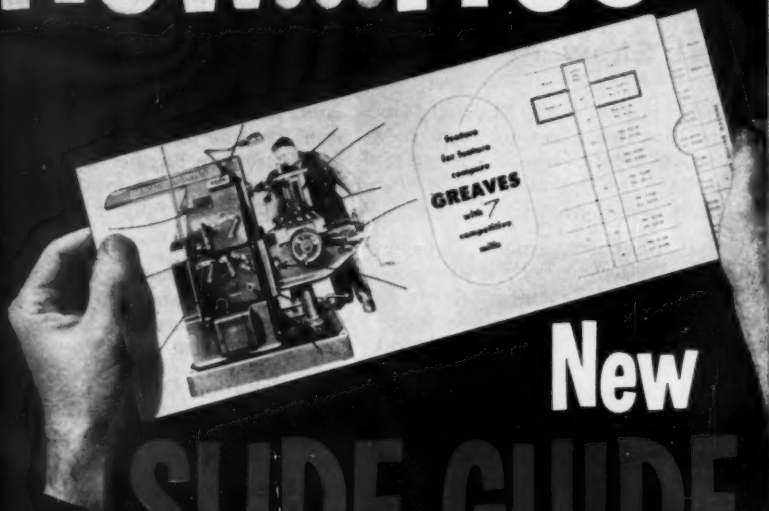
(see Number 54.)

(see Number 55.)

(see Number 56.)



Now...Free



New SLIDE GUIDE

With this new and different slide rule type comparison chart you can check 21 essential specifications of 8 leading heavy duty milling machines. Compare their capacity, speeds, feeds, etc., at a glance.

Just fill in the coupon, and mail the entire ad for your FREE copy.

"MAIL
ENTIRE
AD TODAY!"



GREAVES MACHINE TOOL COMPANY
2600 Eastern Avenue, Cincinnati 2, Ohio
Send me my FREE copy of the "Slide-Guide"

Name Title

Firm

Address

City Zone State

Metal Show in Cleveland Oct. 8-12

The 1956 edition of the National Metal Exposition and Congress, to be held in Cleveland from October 8 through the 12th, will be the largest in the 38 year history of the show.

Wm. H. Eisenman, general manager, and national secretary of the American Society for Metals, sponsor, reports an exhibitor roster of 465 companies whose displays will fill 250,000 square feet available in the city's Public Auditorium and Exhibition Halls. Theme for this year is "spend to save."

"Strong emphasis on the cost-cutting economies of new equipment will be stressed more than ever this year. Greater efficiency in operation means only one thing—greater production savings," observes Eisenman.

Advance estimates indicate attendance at the show will be close to 46,000. Registration falls into three classes—members of the American Society for Metals and of associated societies, guests invited by exhibitors, and the general industrial public.

All sessions of the National Metal Congress with its program of more than 150 technical papers will be held in four hotels of the city, each a headquarters for one of the four technical societies participating.

The American Society for Metals will be quartered at the Statler; The American Welding Society at Hotel Cleve-

land; the Metals Division of the American Institute of Mining, Metallurgical, and Petroleum Engineers in Hotel Carter, and the Society for Non-Destructive Testing will rally in Hotel Hollenden.

Hours of the show on the first three days will be from 12:00 noon to 10:30 p.m. and on the last two days from 10:00 a.m. to 6:00 p.m.

On Saturday, October 6 and Sunday, October 7, the American Society for Metals will hold its pre-Metal Show Seminar in Hotel Statler on "Creep and Recovery." A total of 13 papers will be presented. Coming specially to the United States to appear Saturday evening at 8:00 p.m. (October 6) is Dr. E. N. da C. Andrade, former director of the Davy-Faraday Laboratory and Honorary Librarian of the Royal Society, London, England.

Among the technical sessions having more than ordinary scientific significance will be a one-day conference on Thorium Metal October 11, jointly sponsored by the Atomic Energy Commission and the American Society for Metals. It will be chaired by four leading scientists: Drs. F. H. Spedding and H. A. Wilhelm, Director and Assistant respectively of The Institute of Atomic Research, Ames Laboratory, Ames, Iowa, and Mr. E. Epremian, Chief Metallurgical Branch, Division of Research



Operations like this are always interesting to concerns who need dependable, cost-cutting lathes for their own products or to build equipment for others.

For example, at Bell Aircraft, Buffalo, New York, this SIDNEY LATHE is making a sleeve for a tool grinding machine which will be used for grinding parts for their rocket engines. Naturally they need and get allowable tolerances of .001 (\pm) without any trouble.

Bell Aircraft also uses SIDNEY LATHES to machine gear cutters which are used in connection with their guided missile program.

THERE'S NO END TO WHERE AND
HOW YOU CAN USE SIDNEY LATHES

it's a
SIDNEY
HEAVY-DUTY LATHE

MAKING A SLEEVE FOR A
TOOL GRINDING MACHINE...

AT

BELL AIRCRAFT

CORPORATION

IN

BUFFALO, NEW YORK

WRITE
FOR
BULLETINS



THE SIDNEY MACHINE TOOL CO. • SIDNEY, OHIO

Builders of Precision Machinery since 1904

and R. Carson Dalzell, Assistant Director, Engineering Development Branch, both of the U. S. Atomic Energy Commission of Washington. The conference is to present 22 talks by top atomic-nuclear experts. It is one of the first conferences of its kind held.

Departing from past procedure, the Metal Society is sponsoring a special forum on die life and die wear, a day's program limited to 200. From this "participating" forum is hoped will come much data helpful to the stamping industry.

The annual meeting of the American Society for Metals will be held Wednesday morning, October 10 in Hotel Statler and the annual dinner will follow October 11 at the same hotel.

Winner of the Albert Sauveur Achievement Award presented by the Metal Society for distinguished accomplishments in the field of metallurgy will receive the engraved plaque during the banquet.

Dr. Charles S. Barrett, professor at the University of Chicago, Institute of Metals Study, will deliver the Campbell Memorial Lecture following the annual meeting. His topic will be "Metallurgy at Low Temperatures".

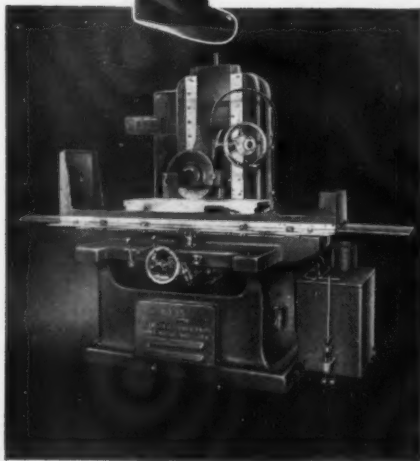
Assistant director of the show is Chester L. Wells. Headquarters for the operations of the Metal Exposition and Congress are 7301 Euclid Avenue, Cleveland 3, Ohio.

Exhibitors	Space No's.
Aaron Machinery Co., Inc.	2224
Abaco Industries, Inc.	2434
Acetogen Gas Co.	2656
Acme Steel Co.	1933
Acme Tool Co.	715
Adamax Carbide Corp.	1747
Advance Glove Mfg. Co.	2803
Aeronautical Service Eng.	2751
Aeroprojects Inc.	2333
Ajax Electric Co.	1609
Ajax Electrothermic Corp.	1609
Ajax Engineering Corp.	1609

Aldridge Industrial Oils, Inc.	525
Al-Fin Div.	2324
Allegheny Ludlum Steel Corp.	451
Allis-Chalmers Mfg. Co.	2509
Allison Div.	1816
Alloy Engineering & Casting Co.	936
American Brake Shoe Co.	215
American Cast Iron Pipe Co.	2144
American Chain & Cable Co., Inc.	1816
American Chemical Paint Co.	2332
American Cyanamid Co.	1501
American Cystoscope Makers, Inc.	2836
American Gas Ass'n.	2859
American Gas Furnace Co.	2841
American Gas & Elec. Serv. Corp.	2007
American Herforder Corp.	2033
American Machine & Metals, Inc.	241
American Metal Market	1745
American Optical Co.	1136
Amer. Positive Grip Vise Corp.	2773
American Pullmax Co., Inc.	2521
American Silver Co., Inc.	930
American Society for Metals	1706
American Wheelabrator & Equipment Corp.	2580
Amperex Electronic Corp.	2635
Apex Tool & Cutter Co., Inc.	2816
Applied Research Laboratories	2112
Arcweld Manufacturing Co.	2302
Aro Spotwelder Div.	2733
Ashworth Brothers, Inc.	2660
Assembly Products, Inc.	1702
Atlas Mineral Products Co.	2729
Audubon Wire Cloth Corp.	2728
Babcock & Wilcox Co.	522
Baird Associates, Inc.	1234
Balcrank Inc.	521
Baldwin Lima Hamilton Corp.	2104
Balteau Electric Corp.	2622
Banner Welder, Inc.	2769
Barber-Colman Co.	1829
Barer Eng. & Mach. Co., Ltd.	2316
Barker Engineering Co.	2830
Bausch & Lomb Optical Co.	422
Bean & Co., Morris	920
Bede Products Corp.	1101
Bendix Aviation Corp.	2123
Beryllium Corp.	1834
Binks Manufacturing Co.	2755
Black Drill Co., Inc.	914
Blackstone Corp.	2552

FOUND WHERE WORLD FAMOUS AIRCRAFT ARE "BORN"

GRAND RAPIDS GRINDERS



GRAND RAPIDS NO. 55 HYDRAULIC FEED SURFACE GRINDER
This precision tool room type machine has table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1925 and 2500 rpm.



Just a note on your letterhead will bring you full details.

Just take a look in their toolrooms! Every one of these famous aircraft manufacturers uses Grand Rapids Grinders . . . engineered and built for unusual long life of precision grinding. Our Model 55 shown here, for instance, features column and base of massive, one-piece casting for vibrationless rigidity and permanent alignment. Both longitudinal table travel and cross feed are hydraulically actuated. Wheel head has powered rapid vertical travel. Table speed is variable up to 125 fpm . . . faster than any other of this type and size.



BEECH

BELL

BOEING

CHANCE VUGHT

DOUGLAS

GRUMMAN

LOCKHEED

MARTIN

MCDONNELL

NORTHROP

REPUBLIC

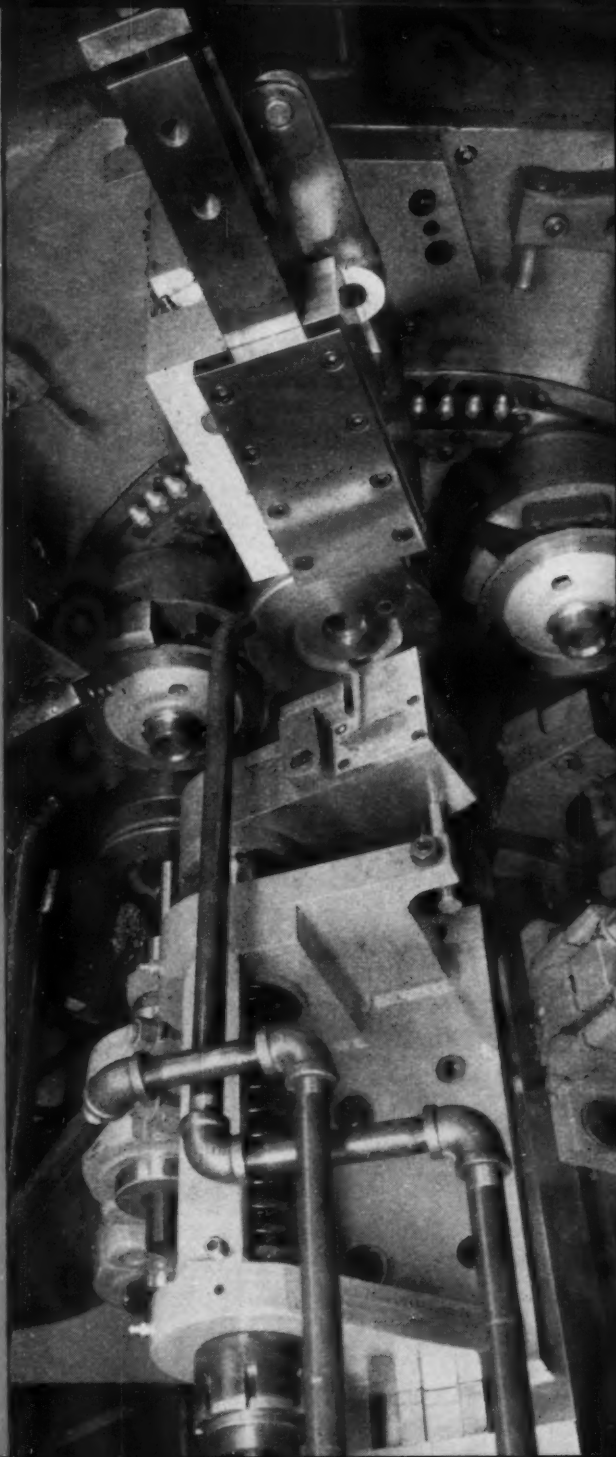
GALLMEYER & LIVINGSTON COMPANY 408 Straight Ave., S.W., Grand Rapids, Michigan

Circle No. 320 on Card, Opposite Page 65

October, 1956

175

Acme-Gridley



JOB FACTS

Piece—Differential case cover

Material—Malleable iron casting

Operations—27 (16 on 1st operation work)—completing both ends of piece in single machine setup

Machine Time—30 seconds

Machine—8"RPA-8 Acme-Gridley

Chucker arranged for double indexing



Write today for your free copy of 16-page illustrated bulletin CM-51A that shows and describes how Acme-Gridley 4, 6 and 8 spindle chucking automatics are designed to give you the maximum return on your investment.

minimizes the importance of the decimal point... maintains automotive quality control

Continuous quality control, so basic to modern automobile production, was implemented by this manufacturer when he chose Acme-Gridley multiple spindle chucking automatics to perform 27 operations on the piece shown at the left. This not only let him do more operations in a single machine setup but, because of Acme-Gridley inherent design for sustained accuracy at high speeds and feeds, gave him decimal point accuracy that remained within control limits for check lot after check lot. Thus he prevents costly production bottlenecks, reduces scrap and maintains a balanced flow of parts to final assembly points.

National Acme

THE NATIONAL ACME COMPANY, 177 EAST 131ST STREET, CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, New Jersey • Chicago 6, Illinois • Detroit 17, Michigan

Exhibitors	Space No's.		
Blakeslee & Co., G. S.	1019	Buck Tool Co.	1528
Boggis & Co., Henry P.	2874	Buda Division	2509
Branson Instruments, Inc.	2145	Budd Co.	1709
Branson Ultrasonic Co. Div.	2145	Buehler Limited	260
Brennen, Bucci & Weber, Inc.	1732	Cadmet Corp.	2667
Brinkmann & Co., Inc., C. A.	201	Cam-Lok Division	2520
Brown Instruments Div.	312	Cammann Manufacturing Co.	1737
Brush Beryllium Co.	531	Campbell Machine Division	1816
Brush Electronics Co.	1726	Carbide & Carbon Chemicals Co.	1608
Buck Manufacturing Co.	2546	Carlingo Commodities Corp.	2107
		Carter Controls, Inc.	803
		Central Foundry Division	2134

Check FIRST with CHALLENGE[®]
WHEN YOU NEED

PRECISION SURFACES

FOR
LAYOUT, INSPECTION & ASSEMBLY

- | | | |
|--|---|--|
| <input type="checkbox"/> Semi-Steel Layout Surface Plates | <input type="checkbox"/> Bench Plates | <input type="checkbox"/> Universal Right Angle Irons |
| <input type="checkbox"/> Black Granite Layout Surface Plates | <input type="checkbox"/> Lapping Plates | <input type="checkbox"/> Angle Plates |
| <input type="checkbox"/> Reading Tables | <input type="checkbox"/> Bench Blocks | <input type="checkbox"/> Universal Box Angles |
| <input type="checkbox"/> Checking Tables | <input type="checkbox"/> Straight Edges | <input type="checkbox"/> Box Parallels |
| <input type="checkbox"/> Adjustable Floor Plates | <input type="checkbox"/> Surface Plates | <input type="checkbox"/> V-Blocks |
| | <input type="checkbox"/> Surface Plate Stands | <input type="checkbox"/> Cast-Iron Work Benches |



THIS CATALOG
.... shows the complete Challenge line of Precision Surfaces—all types, all sizes. See it before you buy any surface equipment.

SE-101

Challenge

TRADE-MARK[®]

MTBB-10

THE CHALLENGE MACHINERY COMPANY GRAND HAVEN, MICHIGAN

Send complete Challenge Precision Equipment catalog. Include information on the items checked above.

Name _____ Title _____

Company _____

Address _____

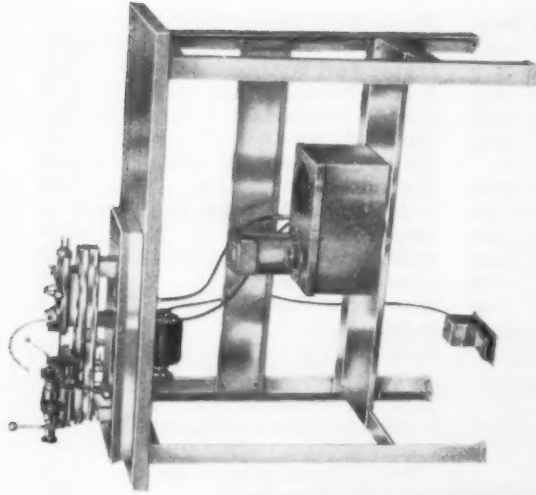
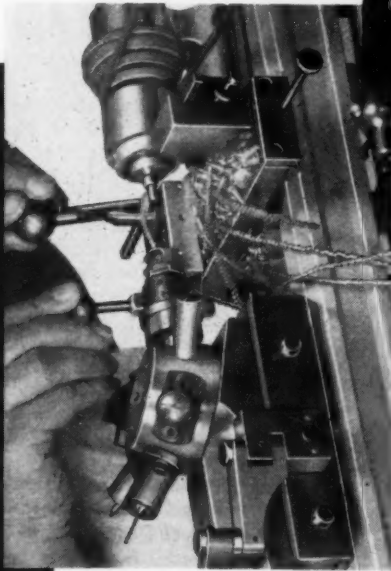
Circle No. 322 on Card, Opposite Page 65

YOU CAN PRODUCE SMALL INSTRUMENT PARTS

WITH MORE

ACCURACY • ECONOMY and SPEED

A small precision turret lathe for second operations and production of instrument parts. Available in two collet capacities, 5/16" or 3/16". The 6 position turret is self indexing and has hardened ways. Turret holes are 1/2" diameter. Turret travel 1-5/8".



LEVIN® TURRET LATHES

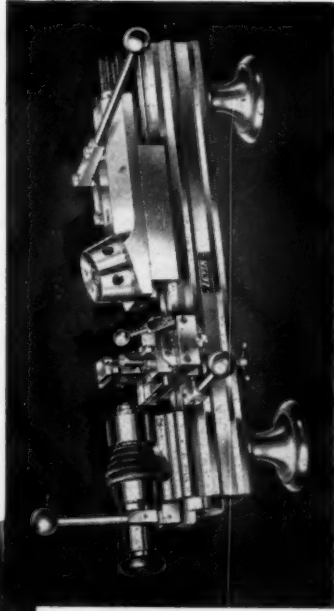
The cross slide has a swivel slide at one end and a rigid tool block at the other. Lever collet closer provides quick opening and closing. A variety of turret tools with 1/2" shanks is available.

Send for catalog M describing complete line of instrument lathes, micro-drilling equipment and accessories.

LOUIS LEVIN & SON, INC.

3610 South Broadway

Los Angeles 7, California



Exhibitors	Space No's.		
Chicago Rivet & Machine Co.	2529	Easton Metal Powder Co.	1703
Cincinnati Sub-Zero Products	2573	East Shore Machine Prod. Co.	2560
Circo Equipment Co.	2101	Eclipse Fuel Engineering Co.	1724
Cities Service Petroleum, Inc.	1229	Eclipse-Pioneer Div.	2123
Clementina Limited	2673	Electric Furnace Co.	1041
Cleveland Designers & Consultants, Inc.	2873	Electro-Alloys Div.	215
Cleveland Electric Illum. Co.	911	Electro Arc Sales Co.	1204
Cleveland Grinding Machine Co.	337	Electro Metallurgical Co.	1608
Cleveland Metal Abrasive Co.	1908	Elox Corp. of Michigan	2131
Clevite Corp.	1728	Empire Products, Inc.	2520
Climax Molybdenum Co.	360	Enamelstrip Corp.	2628
Coated Coil Corp.	2628	Engelberg Huller Co.	2746
Cobalt Information Center	542	Engineered Castings Div.	215
Cold Metal Products Co.	1120	Ercona Corp.	937
Collins Microflat Co.	939	Eriez Mfg. Co.	2716
Commander Manufacturing Co.	736	Exomet, Inc.	2571
Commercial Filters Corp.	2011	FabriSteel Products, Inc.	1421
Consolidated Electrodynamics Corp.	1929	Fairchild Engine & Airplane Corp.	2324
Consolidated Vacuum Division	1929	Falcon Tool Co.	2667
Continental Drill Corp.	532	Farrel-Birmingham Co., Inc.	2777
Continental Industrial Eng. Inc.	2831	Fawick Airflex Div.	1934
Cooper Metallurgical Assoc.	1033	Fawick Corp.	1934
Copperweld Steel Co.	311	Fenn Mfg. Co.	331
Crampton Manufacturing Co.	1730	Fenway Machine Co., Inc.	1204
Crane Packing Co.	2617	Ferrotherm Co.	536
Curtiss-Wright Corp.	2032	Forest City Foundries Co.	2856
Dake Corp.	2554	Fulton Foundry & Machine Co.	2753
Delta Power Tool Div.	1916	Gas Appliance Service, Inc.	2837
deSanno & Son, Inc., A. P.	1942	Gas Machinery Co.	2833
Detrex Corp.	1907	Gasway Corp.	2864
Detroit Testing Machine Co.	1806	General Alloys Co.	351
De Walt, Inc.	2670	General Electric Co.	
Dilley Mfg. Co.	810	Apparatus Sales Div.	305
Di-Met Corp.	2854	General Electric Co.	
Disston Division, Henry	2731	Metallurgical Products Dept.	2124
Diversey Corp.	1012	General Electric Co., X-Ray Dept.	1104
Dixon Sintaloy, Inc.	2774	General Motors Corp.	2134
Documentation & Communication Research Center	270	General Riveters, Inc.	2616
Doehler-Jarvis Div.	2111	General Ultrasonics Co.	2866
Driver Co., Wilbur B.	248	Goodrich Co., B. F.	2535
Driver-Harris Co.	2411	Graham Machine Tool Co.	2403
Drop Forging Ass'n.	2530	Graham Transmissions Inc.	804
Du Bois Company, Inc.	2423	Gray Co., Inc.	2618
duPont de Nemous & Co., Inc. E.I.	1030	Grayco Products	2618
Dynamic Gear Co., Inc.	2871	Gregory Industries, Inc.	1930
Easco Products	1204	Gries Industries, Inc.	550
Eastman Kodak Co.	1002	Gries Reproducer Corp.	550
		Gulf Oil Corp.	1527
		Guthery Machine Tool Corp.	2733
		H & H Research Co.	715
		HPL Manufacturing Co.	1240

Exhibitors	Space No's.		
Hacker & Co., Wm. J.	1709	Heatbath Corp.	1506
Hamler Industries	907	Heil Process Equip. Corp.	2766
Hammond Mach. Builders, Inc.	1250	Heli-Coil Corp.	2415
Harman Assoc., F. Ward	2718	Hevi Duty Electric Co.	209
Harper Electric Furnace Corp.	724	High Vacuum Equip. Corp.	2702
Harris Calorific Co.	223	High Voltage Eng. Corp.	720
Harshaw Scientific Div.	2647	Hobart Brothers Co.	2541
Harshaw Chemical Co.	2647	Holcroft & Co.	346
Hayes, Inc., C. I.	454	Holden Co., A. F.	1415
Haynes Stellite Co.	1608	Holger Andreasen, Inc.	537
		Holliday Co., R. L.	704

for press room flexibility...



Used with any hand-fed press or square shear, this machine instantly provides automatic straightening and feeding. These Littell machines operate independently of using equipment, supply their own smooth, hydraulic power. There is only a simple electrical connection between units, permitting easy reconversion to hand feeding. The machines feed up to 19" lengths at 40 strokes per minute and handle any coil stock up to .125" thick and 24½" wide. Pacemaker control automatically synchronizes feed and press action. Write for Catalog 6-U, giving full details.



ROLL FEEDS • COIL CRADLES
STRAIGHTENING MACHINES
REELS • AIR BLAST VALVES

District Offices: Detroit, Cleveland

4147 N. RAVENSWOOD AVE., CHICAGO 13, ILL.

Exhibitors

	Space No's.		
Hones, Inc., Charles A.	2857	Invincible Vacuum Cleaner	2703
Houghton & Co., E. F.	1145	Mfg. Co.	321
Howard Foundry Co.	212	Ipsen Industries, Inc.	2008
Huck Manufacturing Co.	2805	Ivy Co.	2621
Illinois Testing Lab., Inc.	1214	Janney Cylinder Co.	1111
Induction Heating Corp.	1219	Jarrell-Ash Co.	2572
Industrial Heating Equip. Co.	2561	Jergens Tool Specialty Co.	814
Industrial Tectonics, Inc.	2517	Jerpbak Bayless Co.	2761
Instron Engineering Corp.	2430	Jiffy Disintegrators, Inc.	1924
International Nickel Co.	402 & 408	Johnson & Son, Inc., S. C.	2715
		Jomac, Inc.	

The S-22 MICROFINISH COMPARATOR



GAGE SURFACE FINISH TO NEW A.S.A. STANDARDS - *Quickly - Accurately*

This convenient pocket comparator has 22 precision surfaces for specifying and controlling finish to the new A.S.A. Standard B46.1 - 1955. Electroformed in durable corrosion-resistant nickel, the S-22 Comparator provides every department with the most inexpensive method for uniform, accurate control of finish characteristics.

Save valuable time in engineering, inspection, quality control—eliminate costly overfinishing in purchasing and production. \$15.00 complete with leather case.

Available from leading industrial distributors, or write



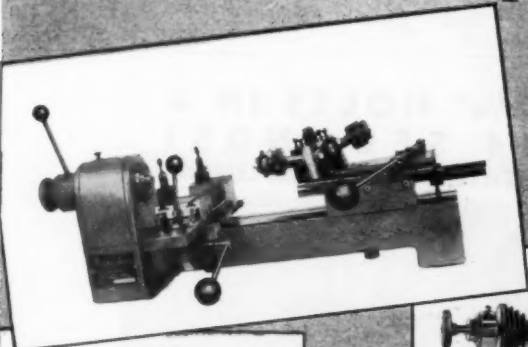
FAIRFIELD DEVELOPMENT LAB., INC.

(SUCCESSOR TO BAPTIST MACHINE CO.)

38 Ludlow Street, Stamford, Conn.

Circle No. 325 on Card, Opposite Page 65

Derbyshire *fine precision equipment*

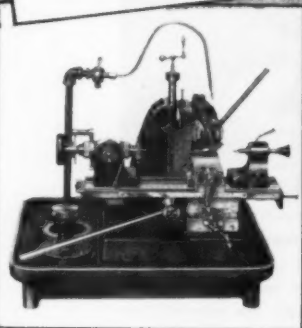


MODEL No. 750

BED 22"

CENTER HEIGHT — 7.50 CM

COLLET CAPACITY — .315"



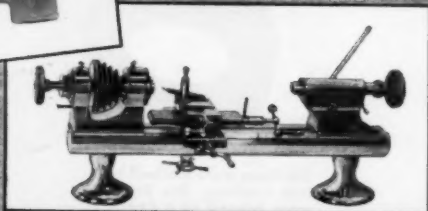
MICROMILL

2 TABLE SURFACES:

7 7/8" x 2 1/4"

12" x 2 1/4"

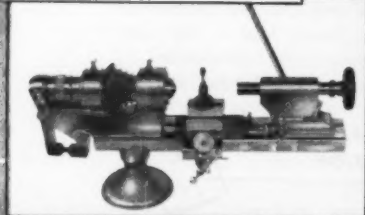
**TAKES
MAGNUS
COLLETS**



ELECT LATHE — 18" BED

CENTER HEIGHT — 2.55" (6 CM)

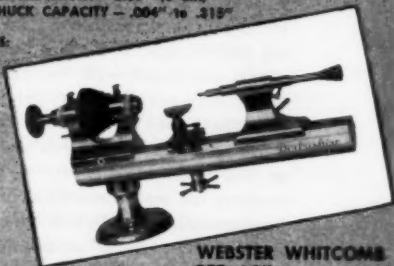
CHUCK CAPACITY — .004" to .315"



MAGNUS LATHE — 12" BED

CENTER HEIGHT — 5 CM

COLLET CAPACITY — .315"



WEBSTER WHITCOMB

BED 12"

CENTER HEIGHT — 5 CM

COLLET CAPACITY — .1800"

F. W. DERBYSHIRE, INC.

157 HIGH ST.

WALTHAM

MASS.

Write for full details

Exhibitors	Space No's.		
Kemp Mfg. Co., C. M.	2853	Kux Machine Co.	1420
Kennametal Inc.	1824	Laboratory Equip. Corp.	2655
Kerns Co., L. R.	2547	Lake Shore Eng. Co.	2542
King Tester Corp.	253	Lakeside Steel Improvement Co.	306
Kinney Mfg. Div.	728	Lee Co., K. O.	2044
Kirkhof Mfg. Corp.	2860	Leeds & Northrup Co.	1129
Knight Models, Inc.	2756	Leitz, Inc., E.	702
Kolcast Industries, Inc.	1119	Lempco Industrial, Inc.	1236
Kolene Corp.	1330	Lepel High Frequency Lab., Inc.	2211
Krouse Testing Machine, Inc.	2512	Lewis Machine Co.	2002
		Lincoln Electric Co.	440

TAPS 6 - 1/4" HOLES IN A *COOL* 14 SECONDS! AND TAPPED 6000 HOLES JUST AS QUICKLY WITHOUT CHANGING TAP



The rings were malleable iron castings. The holes were tapped to a depth of 1/2 inch at 1700 R. P. M.



Hardly seems possible . . . yet this and other equally amazing tooling operations are becoming an everyday occurrence in plants equipped with the new Mistc Mist method of cooling tools. Compressing air generates heat . . . expanding air absorbs heat. Add this to the evaporation of moisture and movement of air and you will understand why the application of mist is the most effective, practical and cleanest method of cooling all metal working processes. Mistc Mist is the most economical and efficient mist generating system available . . . requires no special coolant. Systems available for as low as \$30.00.



Coolant
Mist
Generators

WRITE TODAY FOR COMPLETE
INFORMATION

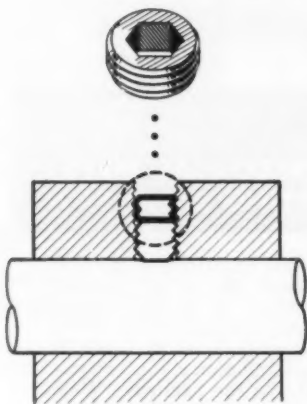


AETNA MFG. Co.
194 SO. YORK ST.,
BENSENVILLE, ILL.

Circle No. 327 on Card, Opposite Page 65

Exhibitors	Space No's.		
Lindberg Eng. Co.	431	McGuire, Thos. B.	907
Lindberg Industrial Corp.	431	Machlett Laboratories, Inc.	2438
Linde Air Products Co.	1608	Magnaflux Corp.	231
Loftus Engineering Corp.	2350	Magnethermic Corp.	2336
Logansport Machine Co., Inc.	2207	Magnetic Analysis Corp.	1235
Los Angeles Dept. of Water & Power	2329	Malayan Tin Bureau	2410
Lufkin Rule Co.	1721	Man-Au-Cycle Corp. of Amer.	2526
Lynchburg Foundry Co.	1519	Manufacturers Processing Co.	2821
M.B.I. Export & Import Ltd.	2312	Marquette Metal Products Co.	2032
		Martin Grinding & Mach. Works	454
		Martindale Electric Co.	1212

STOP SET SCREW SLIPS! ...with Mac-it Hollow Lock Screws



Excessive speed and vibration can't shake loose a socket set screw when the Mac-it Hollow Lock Screw is on the job! Why? Because it's tightened *against the set screw* to produce "internal lock nut" action.

This Mac-it Hollow Lock Screw is a tough customer! It's made of high-grade alloy steel—carefully heat treated throughout for a fine, uniform grain structure. Accurate socket and threads hold their shape even after thousands of adjustments.

Because the hex socket goes all the way through, assembly is quick and easy: a set screw and lock screw may be tightened separately or together using the same key—and the set screw may be re-set without removing the lock screw.

Your local distributor carries complete stocks of Mac-it Hollow Lock Screws in sizes #6 to 1", either N.C. or N.F. threads, Class 3 fit. Ask him for free samples and literature, or write:

Mac-it Screw Division
STRONG, CARLISLE & HAMMOND COMPANY
1392 West 3rd Street • Cleveland 13, Ohio

Exhibitors

Melard Mfg. Co.
 Metal Carbides Corp.
 Metal Removal Co.
 Metallizing Co. of America
 Metallizing Eng. Co., Inc.
 Metals Eng. Institute
 Metallurgical, Inc.
 Metals Processing Div.
 Metalwash Machinery Corp.
 Met-L-Chek Co.

Space No's.

1734
 2024
 2033
 506
 2233
 1706
 818
 2032
 2847
 704

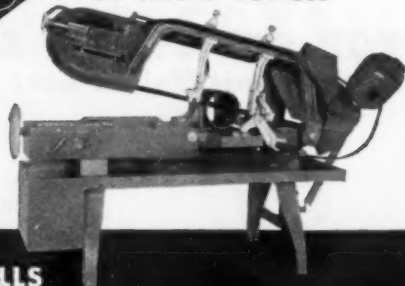
Micrometrical Mfg. Co.

Miller Fluid Power Co.
 Miller Motor Co.
 Minneapolis-Honeywell Reg. Co.
 Minnesota Mining & Mfg. Co.
 Modernair Corp.
 Mohawk Tools, Inc.
 Naresco Equipment Corp.
 National Carbon Co.
 National Cored Forgings Co., Inc.
 National Lead Co.

432
 1623
 1623
 312
 2822
 2609
 716
 2108
 1608
 445
 2111



A NEW PRODUCTION TOOL FOR METAL CUT-OFF



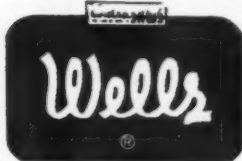
THE WELLS MODEL 1000 HORIZONTAL METAL CUTTING BAND SAW

Here's the newest in the Wells quality line of metal cutting band saws—The Model 1000, a 10" capacity production machine powered by a $\frac{3}{4}$ H.P. motor. It offers the structural rigidity necessary for better cutting and operation and utilizes a 1" blade to further assure accuracy and efficiency.

The Model 1000 also features the exclusive Wells "constant load" blade tensioning device, four selective speeds, hydraulic frame check and optional wet cutting system.

See your Wells Distributor, or write for full details.

See us in booth 1912 at the Metal Show



The Pioneers of Horizontal

METAL CUTTING BAND SAWS

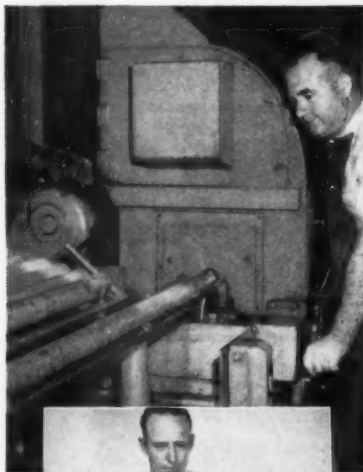
WELLS MANUFACTURING CORPORATION
 707 Coolidge Avenue • Three Rivers, Mich.

Circle No. 329 on Card, Opposite Page 65

Abrasive Cutting

*the best way to cut many materials
the only way to cut some*

Campbell Cut-Off Machines



Slice \$32,000 a year from tube cutting costs

Because CAMPBELL Abrasive Cut-Off Machines not only cut stainless steel tubes twice as fast as former methods—but the clean cut saves a de-burring process—Ryan Aeronautical Company saved \$32,000 the first year of operation.

The smooth-finish cut of the CAMPBELL Oscillating Wet Abrasive Cut-Off Machine is extremely accurate—with no hard spots, no change in metallurgical characteristics. It results from the WET cut with abundant coolant supplied just where it will do the most good. Speed and economy come from the OSCILLATION of the abrasive wheel . . . the right one for the job.



• Cutting 20-foot tubes of stainless steel into 1" to 17" lengths

VISIT BOOTH 1016
NATIONAL METAL SHOW
CLEVELAND AUDITORIUM
OCT. 8-12, 1956



How to get expert advice on your cutting problems

- CAMPBELL Engineering Service costs you nothing—can save you much. Does your metal cutting problem involve cutting of alloy or high-carbon steel? Our Field Engineers are abrasive-cutting specialists. They can help you arrive at the right combination of a CAMPBELL Cut-Off Machine and ALLISON Cutting Wheel to improve your operation and save you money.

ACCO



Campbell Machine Division AMERICAN CHAIN & CABLE

937 Connecticut Avenue, Bridgeport 2, Connecticut

Exhibitors

Natl. Malleable & Steel
Castings Co.

National Precision Cast. Corp.

National Research Corp.

National Spectrographic Labs.

National-Standard Co.

National Torch Tip Co.

National-U.S. Radiator Corp.

Nelson Stud Welding Div.

Space No's.

2434

2828

2108

2830

2608

2632

2515

1930

New Hermes Engraving
Machine Corp.

New York Air Brake Co.

Nicholas Equipment Co.

Nichols Co., R. W.

North American Mfg. Co.

North American Philips Co., Inc.

North American-Viking Drill Co.

Norton Co.

Nuclear Energy Div.

Oakite Products, Inc.

2510

728

2424

1323

1512

2635

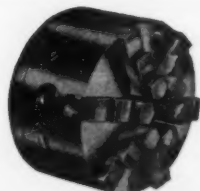
532

2414, 2657

2854

941

compare HORTON Tru-Set FEATURES



- Repetitive accuracy to .0002" T.I.R. guaranteed
- Rugged Meehanite bodies guaranteed for life
- Instant peripheral location - 3 operating pinions
- Available up to 12" in both 3 and 6 jaw styles
- Packed in reuseable airtight metal containers

compare HORTON Tru-Set PRICES

SIZE	MODEL	NET PRICE
5	5T6	86.35
6	6T6	120.65
8	8T6	167.65
10	10T6	247.65
12	12T6	298.45

Chucks listed above are 3 jaw universal type with two sets of jaws. See your Horton Distributor or write direct for new Net Price Selector



HORTON CHUCK DIVISION
GREENFIELD TAP AND DIE CORPORATION
WINDSOR LOCKS, CONN.



POP'S School of Filing



POP SURE TOLE MERTON OFF
WHEN HE CAUGHT 'IM
CHUCKIN' FILES INTO
TH' TOOLBOX

POP SAYS THAT GOOD
FILES DESERVE GOOD
CARE, SO OUR MERTON'S
BEIN' EXTRA CAREFUL
NOW!

Nicholson and Black Diamond files are fine hand tools from a manufacturer who specializes in files and files alone. In steels made to exacting specifications, in blanks checked for exact conformity to a master blank, in precisely cut teeth that are given an extra-keen edge by sandblasting—in dozens of painstaking manufacturing steps and unremitting quality controls, you are assured that there are no finer files than those made by Nicholson.

An X.F. (Extra Fine) Swiss Pattern file

is shown here. It is one of hundreds of Swiss Pattern types and sizes. In addition there are literally thousands of cuts, sizes and shapes of Regular and Special Purpose Nicholson and Black Diamond files for all industrial filing needs. These fine tools needn't be treated with the exaggerated care that Merton is showing in the cartoon. But they'll cut faster and last longer if you keep them clean and keep them in a file rack. As Pop says, good files deserve good care.



NICHOLSON FILE COMPANY, Providence, R.I.

(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)



NICHOLSON and BLACK DIAMOND FILES

A FILE FOR EVERY PURPOSE

Circle No. 332 on Card, Opposite Page 65

Exhibitors	Space No's.		
Ohio Crankshaft Co.	2212	Pangborn Corp.	1901
Ohio-Hydro Deburring Co.	2564	Pantex Mfg. Corp.	2666
Ohio Metal Working Prod. Co.	505	Park Chemical Co.	1515
Ohio Nut & Bolt Co.	2760	Patterson Machine Co., G. C.	2442
Ohio Seamless Tube Division	311	Pedrick Tool & Machine Co.	2456
Ohio Steel Foundry Co.	910	Peerless Electric Co.	706
Olsen Testing Mach. Co., Tinius	1137	Perkins Machine Co.	2404
O'Neil-Irwin Mfg. Co.	1410	Phillips Mfg. Co.	1320
Osborn Mfg. Co.	2116	Phoenix Products Co.	2567
Overbeke-Kain Co.	2620	Picker X-Ray Corp.	2557
		Pioneer Central Div.	2123



**low
cost
precision
stamping**

with

KENCO

1½ to 15 ton

PUNCH PRESSES

Low cost because Kenco presses are quality-built throughout to produce at top speed, and with the least downtime you've ever experienced.

Precision stamping—a result of unusually rigid frames... extra long ram guides and slides that permit full use of the guiding area at the bottom of the stroke.

Send for full details on money-saving Kenco presses.

KENCO MANUFACTURING CO.

Mfrs. of Precision Machinery and Accessories.

5211 TELEGRAPH ROAD, LOS ANGELES 22, CALIFORNIA

Exhibitors

	Space	No's.		
Plastic Metals Div.		2515	Pressco Casting & Mfg. Corp.	2615
Pneuma-Serve, Inc.		1110	Production Machine Co.	1809
Porter Co., Inc., H. K.		2731	Pyrofax Gas Corp.	1608
Portomag, Inc.		2708	Pyrometer Instrument Co., Inc.	1037
Precision Castings Co., Inc.		1038	Radiator Specialty Co.	2867
Precision Metalsmiths, Inc.		1830	Randall Mfg. Co., Inc.	2564
Precision Scientific Co.		2568	Ransburg Electro-Coating Corp.	1714
Precision Shapes, Inc.		510	Ransohoff, Inc., N.	2734
Precision Steel Warehouse, Inc.		2140	Raytheon Mfg. Co.	2848
Precision Tube Co., Inc.		2832	Reeves Div.	1130
			Reid-Avery Co.	2861

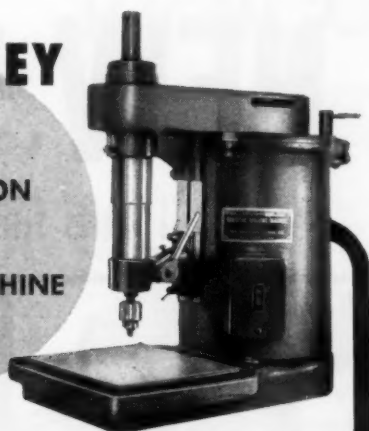
SIGOURNEY

M-100

the PRECISION

BENCH

DRILLING MACHINE



No ordinary bench drilling machine, but an extremely accurate, high speed, sensitive machine for precision drilling. Drills from $\frac{1}{4}$ " down to extremely small sizes. Successfully used down as far as .008".

Table and column exactly squared, one to the other, and built with strength and rigidity for maintained accuracy. Hardened and ground spindles insure long life. Sealed ball bearings throughout for smooth operation from 4,000 r.p.m. to 10,000 r.p.m. Motor, driving belt, and spindles entirely enclosed for safety. Available with 1, 2, 3 and 4 spindles.

SIGOURNEY TOOL COMPANY

(Division of The Smyth Mfg. Co.)
HARTFORD 6, CONNECTICUT



SEND FOR
ILLUSTRATED
BULLETIN

Sole Sales Agent

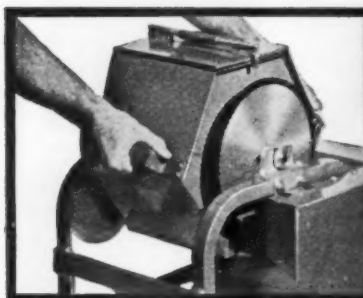
PRATT & WHITNEY COMPANY

INCORPORATED

West Hartford 1, Connecticut

Exhibitors	Space No's.		
Reliance Electric & Eng. Co.	1130	Scherr Optical Tools, Inc., Geo.	710
Renite Co.	1732	Schrader's Son Div., A.	1812
Renton & Co., R. W.	2852	Sciaky Brothers, Inc.	2206
Richards Co., J. A.	1230	Scientific Electric	2502
Riehle Testing Machines Div.	241	Scott Paper Co.	703
Rockwell Mfg. Co.	1916	Scovill Mfg. Co., Inc.	1812
Rodgers Hydraulic, Inc.	2722	Sealol Corp.	1505
Rotherm Eng. Co., Inc.	711	Sentry Co.	1203
Ryerson & Son, Inc., Joseph T.	405	Service Diamond Tool Co.	1735
S. P. Mfg. Co.	2850	Sheffield Corp.	455
		Sheldon Machine Co., Inc.	1723
		Shell Oil Co.	1316

NEW **HANDEE** Slide Abrader **LOW COST** for Small parts finishing



SPECIFICATIONS

Bearings:

Open double end trunnion type, heavy duty

Motor: 1/4 h.p., speed 1750 rpm.

Drum Dia.: 13"

Drum Width: 8"

Net Weight: 63 1/2 lbs.

Bench Space: 16" x 25"

Height: 20 1/2"

Construction:

Steel welded; abrasive resistant drum lining

- Pays for itself in 15 runs.
- Eliminates expensive handwork.
- Uses Novaculite or other conventional types of tumbling media and compounds.
- Effectively deburrs and finishes small parts.
- Portable . . . has three-speed drive.
- Rugged Construction . . . precisely engineered.

Write for complete information.

Another First for Chicago Wheel & Mfg. Co.

Dept. MT-10, 1101 W. Monroe Street, Chicago, Illinois

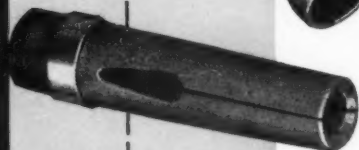
Circle No. 335 on Card, Opposite Page 65



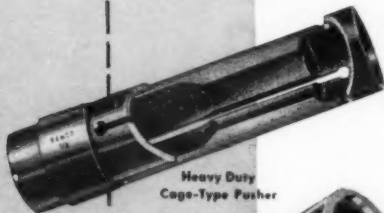
Squirrel Cage
Pusher



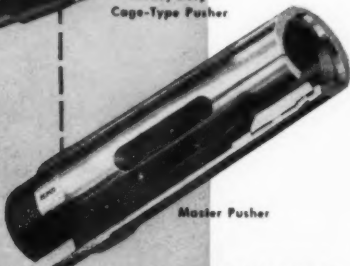
"Multi-Split"
Feed Finger



Conventional Pusher



Heavy Duty
Cage-Type Pusher



Master Pusher

BENCO MAKES:

Master Pushers and Pads
Master Collets and Pads
Pushers and Feed Fingers
Conventional Collets
Ejector Collets
Collet Sleeves and Chuck Nuts
for B. & S. Machines
Carbide Faced Stock Stops
for B. & S. Machines

cost cutting
time saving

BENCO PUSHERS

Whatever your feeding problem, regardless of the type of machine or material, you get smoother, faster feeding with Benco Pushers and Feed Fingers. Accurate tension is achieved through exclusive design, precise heat treating of oil hardened tool steel and rigid inspection.

Benco Pushers, whether adjustable, solid or Master type, will save you time and money on the production line and turn out the highest quality work.

Model "A" Master Pusher shown at left has formed key which holds pads securely in place. New rockerring allows pads to adjust themselves to a full bearing on bar... avoids scoring of stock. Pushers and pads have longer life and do better work.

Let Benco recommend the right type of Pusher or Feed Finger for your jobs, whether they are simple or difficult; long feed-outs, high speeds or scratchless operations. For best results... insist on Benco.

Ask for our special deal on Benco Master Pusher and Pad Kits for B. & S. Machines. With these kits you save money and time by having the right thing at the right time.

BENCO

COLLET MANUFACTURING CO.

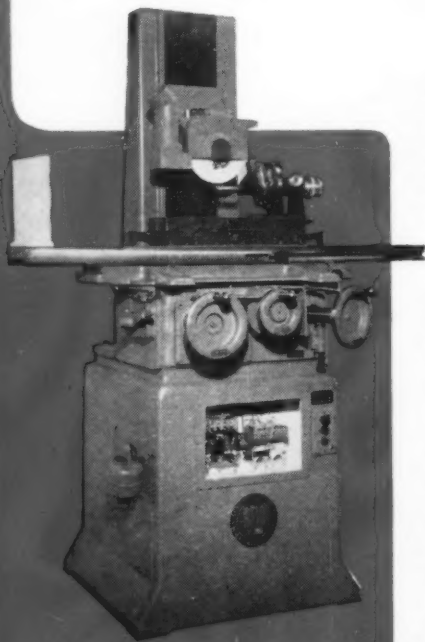
Cleveland 14, Ohio

REPRESENTATIVES: Dorow Machine Tools, Wichita, Kansas; Harry Dunn Corp., Houston, Texas; J. K. Bousum Co., Detroit, Michigan; Walter J. Greenleaf Co., Pittsburgh and Erie, Pennsylvania; Hospelhorn Tool & Supply Co., Dayton, Ohio; Kel-Sir Co., Milwaukee, Wisc.; Fred J. McMillen, Providence, R.I.; Philadelphia Tool Co., Bala-Cynwyd, Pa.; Pearce-Dengel Tool Co., Hasbrouck Heights, N.J.; Frank M. Wilson, Buffalo, N.Y.; W. C. Straub, Cleveland, Ohio; G. W. Wittlinger, Chicago, Illinois; Southern Tool & Equipment Co., Memphis, Tenn.; H. M. Scherling, Minneapolis, Minnesota; H. F. Soderling Co., Seattle, Washington; Mason Machine Tool Co., Salt Lake City, Utah and Denver, Colorado; General Foundry & Mach. Co., Sanford, N.C.; Hudson Tool Service, Huntington, Ind.; Production Tools, Toronto, Ont.



SETS THE STANDARD *for Precision* SURFACE GRINDERS

MODEL 824 Reid-O-Matic with push-button controls for fast selection of all grinding operations and quicker set-up and changes. Outstanding features, for production and toolroom grinding, include: finger-tip level controls, electrical components in single, sealed base housing for easy access, and adjustable gibs on head ways.



Specifications:

Capacity — 8" wide, 24" long, 15" high
Worktable — 66" by 10 $\frac{1}{4}$ " overall
Table speed — infinite variation, 0 to 75 fpm.
Feed range — elevating mechanism, to .0005";
vernier, to .0001"
Spindle — 2 H.P., 1800 rpm. (std. cartridge type)

MODEL 618 — the standard for truly precise toolroom grinding. Features include: rugged construction with one-piece column, cogged timing belt for smooth table operation and sealed cartridge type motorized spindle for smooth chatter-free operation.

Specifications:

Capacity — 6" wide, 18" long, 17 $\frac{1}{4}$ " high
Worktable — 51" by 8" overall
Table speed — infinite variation, 12 to 35 fpm.
Feed range — elevating hand wheel to .0005";
cross feed — to .001"
Spindle — 1 H.P., 3450 rpm.

*For full details and specifications write for
Bulletin 800-16*

Reid Brothers



Company, Inc.

BEVERLY

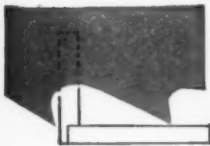
MASSACHUSETTS

NEW *Hook-Tooth*

LENOX HOOK-TOOTH BAND SAW BLADES

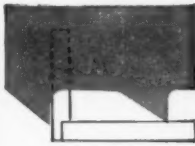
**With Positive Rake and Rounded Gullets
Cuts Faster, Freer . . . Lasts Longer
For Non-ferrous Metals, Wood, Plastics**

Hook-Tooth



Hook-Tooth Blade with a *positive rake*. Teeth hook themselves into the work. They saw instead of scraping and they cut full helical chips.

Conventional Blade



Cuts Faster

The positive rake teeth incline toward the work for quicker penetration and faster cutting.

Cuts Freer

Hook-Tooth digs in and takes big full chips from the material. Rounded gullets allow the chips to form and clear with ease.

Lasts Longer

Hook-Tooth meets less resistance, generates less friction and heat. So, Hook-Tooth lasts longer and gives more cuts per blade.

Costs Less

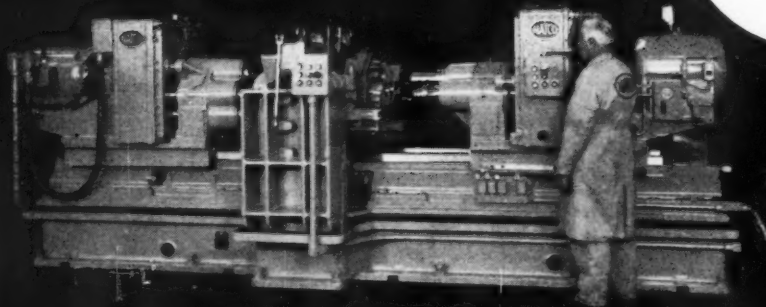
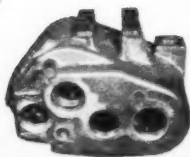
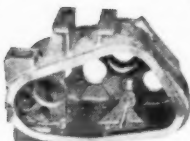
Anyway you look at it—in terms of greater production, lower blade costs, less man-hours, fewer machines—it all adds up to real savings with LENOX Hook-Tooth Band Saw Blades.

AMERICAN SAW & MFG. COMPANY

SPRINGFIELD, MASS.

Natco[®] Automatic Matches Boring Mill Accuracy

and quickly converts for five different jobs



This Natco two-way machine stepped in where automatics "fear to tread!" It replaced a precision boring mill, speeded production and didn't give up a tenth in accuracy! At The Frank G. Hough Co. boring mills were used for exacting tolerances on transmission parts for the Hough Payloader[®]. Higher production was desired.

Now with a Natco two-way automatic, Hough is getting production rates—not job shop rates. The Natco bores diameters to within .0005"—square with mounting face within .0005" per inch bore length. The machine also chamfers, counterbores and notches boss contours.

Versatile too! Hough processes five different transmission housings or covers with a single machine. After a typical production run averaging 100 parts, the machine is quickly converted to another job.

Ask for information about the PAYD (Pay-As-You-Depreciate) Finance Plan.

Currently 86% of Natco's shipments are on or ahead of schedule.

National Automatic Tool Company, Inc.

Richmond, Indiana

Multiple-spindle drilling, boring, facing and tapping machines. Special machines for automatic production.

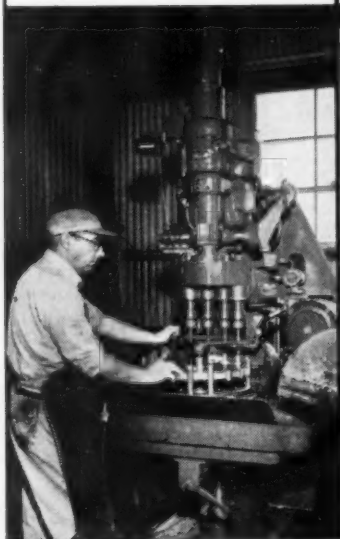
Call Natco offices in
Chicago, Detroit, Buffalo,
New York, Boston,
Philadelphia, Cleveland
and Los Angeles;
distributors in other cities.



Exhibitors	Space No's.		
Sieburg Industries, Inc.	2770	Spencer Turbine Co.	2749
Sinclair Refining Co.	2646	Sperry Products, Inc.	1428
Sintox Corp. of America	1823	Spitfire Tool Co.	2854
SKIL Corp.	2239	Standard Electrical Tool Co.	1047
Skinner Chuck Co.	2601	Standard Oil Co. (Ohio)	2307
Socony Mobil Oil Co., Inc.	1840	Standard Parts Co.	2671
South Chester Corp.	1017	Stanley Electric Tools Div.	1741
Spee-Flo Company	2772	Stanley Works	1741
Spencer Scientific Instruments	1136	Starrett Co., L. S.	919
		Steel City Testing Machines, Inc.	1324
		Stimpson Co., Inc., Edwin B.	411

Thompson Products Inc.

West Coast Division



tapping
production
DOUBLED
in
pieces per hour
with
longer tool life

KAUFMAN

There's a good reason for that kind of a record. *Kaufman specializes in building tapping machines . . . highly-precision machines designed for high production runs or for the versatile, multiple machine shop requirements. For complete information on how you can reduce production costs in your plant . . . send prints and samples of your work to*

KAUFMAN MFG. CO.

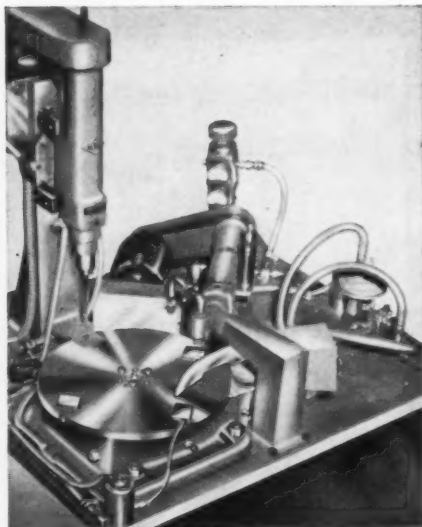
539 S. 29th St.

Manitowoc, Wisconsin

Exhibitors

	Space No's.
Stokes Machine Co., F. J.	1520
Stone Machinery Co.	2011
Struers Chemical Lab.	815
Sunbeam Corp.	942
Superior Foundry, Inc.	1207
Superior Pneumatic & Mfg., Inc.	2819
Superior Tube Co.	1220
Supreme Products, Inc.	2721
Surface Combustion Corp.	421
Swift Industrial Chemical Co.	836

Taylor Instrument Companies	2817
Technic, Inc.	811
Tech-Pacific Corp.	1730
Telenews Productions, Inc.	801
Tempil° Corp.	929
Texas Co.	1602
Thomson Electric Welder Co.	1751
Thor Power Tool Co.	2723
Tickle Eng. Works, Inc., Arthur	2326
Timken Roller Bearing Co.	1051
Tinnerman Products, Inc.	1029
Titanium Alloy Mfg. Div.	2111



ALLEN AIR

INDEXING**DIAL FEED TABLES****WITH****POSITIVE LOCK FEATURE**

**ALSO AVAILABLE:
ALLEN AIR VALVES & CLAMPS**

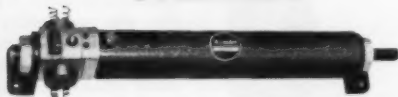
ILLUSTRATED CATALOGS SENT ON REQUEST.

The A. K. ALLEN CO.

**57 MESEROLE AVENUE
BROOKLYN 22, NEW YORK**

AGENTS IN PRINCIPAL CITIES

CYLINDERS



**Plain or with Built-in Valves.
Up to 20" of stroke in stock.**

Circle No. 337 on Card, Opposite Page 65

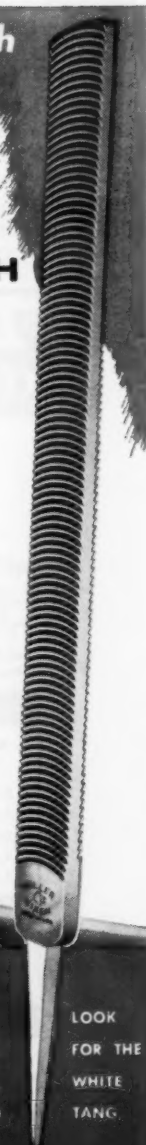
Get freer—faster cutting action with

HELLER[®] VIXEN[®] MILLED CURVED-TOOTH FILES

Deep gullets and wide pitch enable chips and filings to drop free—thus leaving a smooth, even finish.

The exclusive undercut of the teeth gives a positive cutting action—bites deep and removes the metal fast and evenly.

Stroke for stroke, the HELLER VIXEN gives more file value than any file on the market. It was the original and it's *still* the best!



NUCUT[®]
AMERICAN PATTERN

HELLER
American-Swiss[®]
SWISS PATTERN

HELLER TOOL CO.

A subsidiary of The South Saw and Steel Company

NEWCOMERSTOWN, OHIO

Branches: New York, Detroit, Chicago, Los Angeles

LOOK
FOR THE
WHITE
TANG.

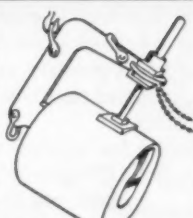
YOUR HELLER DISTRIBUTOR CAN SUPPLY ALL YOUR FILE NEEDS

Exhibitors	Space No's.	United Scientific Co.	2661
Titanium Metals Corp. of Amer.	1241	United Shoe Machinery Corp.	1835
Tocco Div.	2212	U. S. Automatic Corp.	1101
Torit Mfg. Co.	935	U. S. Electrical Motors, Inc.	2230
Torsion Balance Co.	1740	U. S. Gypsum Co.	830
Trerice Co., H. O.	816	U. S. Rubber Co.	2823
Tubular Micrometer Co.	1009	United Wire & Supply Corp.	554
Turco Products, Inc.	2234	Universal Castings Corp.	2754
Uddeholm Co. of America, Inc.	815	Universal Tumbling Supply Co.	2570
Union Carbide & Carbon Corp.	1608	Uniworld Research Corp. of Am.	809
Union Mfg. Co.	2629	Upton Electric Furnace Co.	1509
		Utica Drop Forge Co.	1221

Dixon *ONEMAN* COIL GRABS COST LESS...increase efficiency & safety



Coil Grab—up to 5,000 lbs. cap., 1" to 24" widths



Coil Handler—up to 15,000 lbs. cap., 18" to 48" widths



Coil Hook—up to 1,000 lbs. cap., 1/4" to 6" widths

COIL GRAB

Model No.	Max. Coil Wgt. - Cap.	Width Stock Handled		Radial Cap. Stock Hld.	
		Min.	Max.	Min.	Max.
A-10	1,000 lbs.	1"	4"	3 1/2"	13"
A-20	2,000 lbs.	2 1/2"	9"	3 1/2"	12"
A-35	3,500 lbs.	7"	16"	4"	12"
A-50-12	5,000 lbs.	4"	12"	7"	24"
A-50-24	5,000 lbs.	10"	24"	4"	10"

COIL HANDLER

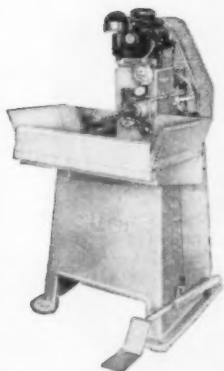
M-30	15,000 lbs.	18"	30"	8"	16"
M-36	15,000 lbs.	24"	36"	8"	16"
M-48	15,000 lbs.	24"	48"	8"	16"

COIL HOOK

H-10-6	1,000 lbs.	1/4"	6"	1"	13"
--------	------------	------	----	----	-----

Dixon Write for FREE Literature
AUTOMATIC TOOL, Inc.
2300 23rd AVE. • ROCKFORD, ILLINOIS

Circle No. 339 on Card, Opposite Page 65



SUNNEN HONING
Produces geometrically perfect holes
free from chucking distortion...with production tolerances down to .0001", and precision limits down to .000025" if needed

SUNNEN HONING
Corrects all hole errors:
OUT-OF-ROUND • TAPER • BELLMOUTH
WAVINESS • BARREL SHAPE • LOSS
TOOL CHATTER

SUNNEN HONING
Produces base metal surface finish
as fine as 2 micro-inches
RMS in hardened steel...
free from smear metal,
heat checks and chatter
marks.

AVERAGE INSTALLATION: UNDER \$1,000. DIA. RANGE: 1/8" TO 2 1/4"

SUNNEN HONED HOLES — FOR ALL-ROUND PRECISION

5

FREE BOOKLETS

They show how honing
may solve your hole
production problem.

TEAR OUT COUPON NOW

7099

SUNNEN
PRODUCTS COMPANY

7962 MANCHESTER AVE. • ST. LOUIS 17, MO.

- ☐ Send five free booklets.
☐ Have field engineer call for free demonstration.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____



Circle No. 340 on Card, Opposite Page 65

*Your
Best Bet*
and at a low,
low price, too!

Dillon UNIVERSAL TESTER

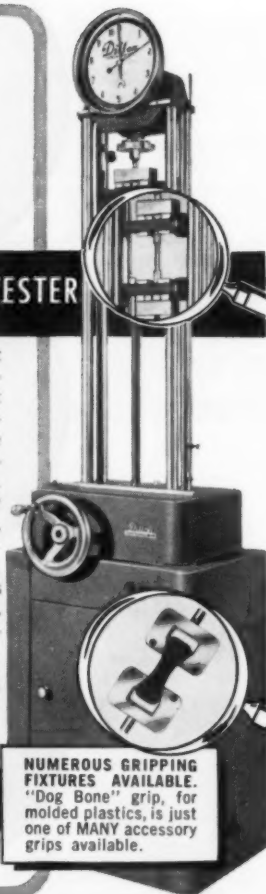
Designed for top accuracy at low cost, the DILLON Universal Tester is your wisest investment. Operates in tensile, compression, transverse or shear. Checks metal, plastics, wire, rubber, springs, etc. 7 interchangeable gauges. For materials up to 125,000 lbs. PSI tensile. Hand wheel operation or motorized. Equipped with max. indicator. Meets most all ASTM & Fed. specs. Handles round, flat or special shapes.

For low strength materials between 0 & 300 lbs. Model M (not shown) is available. Accurate to 1/2 of 1%. Has 5 scales.

Write TODAY for brochures and LOW price schedule.

W.C. Dillon & Co., INC.

14602L Keswick St., Van Nuys 12, Cal.
(suburb of Los Angeles)



Circle No. 341 on Card, Opposite Page 65

Exhibitors	Space	No's.		
Vaco Products Co.		2675	Weatherhead Co.	2029
Vacu-Blast Co., Inc.		2719	Wells Mfg. Corp.	1912
Vanadium Corp. of America		343	Westinghouse Electric Corp.	1711
Vandersee Corp.		2408	Weston Electrical Instrument Corp.	2737
Viking Drill & Tool Co.		532	Wheelabrator Corp.	2580
Waldes Kohinoor, Inc.		2240	Wheelco Instruments Div.	1829
Wales-Strippit Corp.		2405	Whistler & Sons, S. B.	2014
Wallace Supplies Mfg. Co.		2401	Wilson, Inc., K. R.	2407
Watson-Stillman Press Div.		2777	Wilson Mechanical Instrument Div.	1211
Waukee Engineering Co., Inc.		2508	Wilton Tool Mfg. Co.	808
			World Metallurgical Congress	1706

"Same Day" Shipment

from Ex-Cell-O's huge stock of precision

Drill Jig Bushings

For your convenience, Ex-Cell-O maintains huge stocks of precision Drill Jig Bushings, and efficient expediting facilities which make possible "same day" shipment. This means orders are filled and dispatched from complete inventories in New York, Detroit, Los Angeles and London, Ontario, within a few hours after they are received!

Ex-Cell-O Drill Jig Bushings are made of oil-hardening bearing steel selected for its great wear resistance, and hardened in a new

atmosphere-controlled furnace. Material, hardness, dimensional tolerances and finish measure up to the highest standards of quality.

Call, wire or write Ex-Cell-O for the world's finest, fastest and most complete bushing service!

This complete Bushing Guide pictures and describes A.S.A. standard bushings, lists hundreds of Ex-Cell-O bushings available from stock. Write for as many copies as you need.



1. Headless Press Fit Bushings. 2. Head Liners. 3. Fixed Renewable Bushings. 4. Slip Renewable Bushings. 5. Headless Liners. 6. Head Press Fit Bushings.

Ex-Cell-O Corporation

DETROIT 32, MICHIGAN

Manufacturers of Precision Machine Tools • Grinding Spindles • Cutting Tools • Railroad Pins and Bushings • Drill Jig Bushings • Aircraft and Miscellaneous Production Parts • Dairy Equipment

56-13



Circle No. 342 on Card, Opposite Page 65

NEW

NYLON KOOLSHIELD

POSITIVE PROTECTION
FROM HOT REFLECTOR
When Using
100-Watt Lamp



A marvelous new accessory that snaps over reflector to guard against burning.

\$1.02
ea. in
standard
pkg. of 4



FOSTORIA LOCALITES

Finest Seeing Tools Ever Designed for Machine Tools, Assembly, Inspection

Frictional arm and collar disc joints give flexibility of a thousand positions to direct light exactly as wanted. Rugged construction with heavy duty industrial socket Levolver switch and universal base. Millions in use for fast, accurate, safe seeing.

MODEL
55-BM-701

\$790
EACH

In Std. Pkg.
of 4

Fits all
old and
new
model
Localites
with half
shade
reflector

WRITE for complete
catalog of Localite
Models for every in-
dustrial use.



**THE FOSTORIA PRESSED STEEL
CORPORATION, FOSTORIA, OHIO**

Localites are available through
wholesalers everywhere



Circle No. 343 on Card, Opposite Page 65

Exhibitors

Yale & Towne Mfg. Co.
Zaco Laboratories
Zagar Tool, Inc.
Zeiss, Inc., Carl

Space No's.

915
1219
2752
2522

Supreme Products bought by American Safety Razor

The acquisition of Supreme Products, Inc., of Chicago, manufacturer of precision machined parts, geared drill

chucks, electric hair clippers, etc. was announced recently by the American Safety Razor Corp., Staunton, Va. It will become a wholly owned subsidiary of A.S.R. and will be known as Supreme Products Corp. Louis Spatz and David Spatz, co-founders of Supreme, will continue in top management positions. Supreme will remain in its present location and no changes in personnel are contemplated.



PUTNAM END MILLS

Cut Time and Tool Costs

Time and Tool Costs are Cut by using Putnam End Mills. For, they are properly designed and carefully manufactured for free cutting action, longer life and ability to "stand-up" when operated at high speeds and heavy feeds.

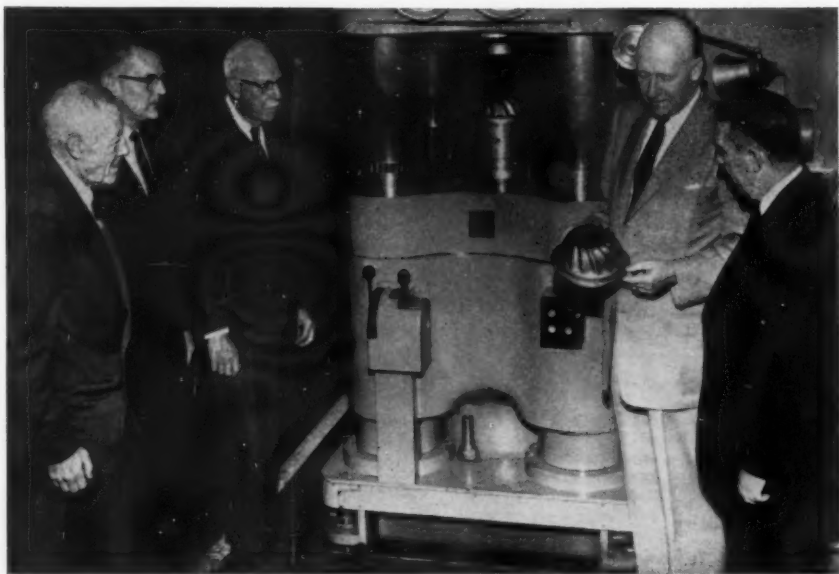
Proven Putnam End Mill superiority assures the ultimate in efficient milling of dies, tough-to-machine materials, non-ferrous metals, etc.

Give them a try on your rugged milling operations and watch them really "hog" in and remove stock.



PUTNAM

2981 CHARLEVOIX AVENUE • DETROIT 7, MICHIGAN



OFFICERS AND DIRECTORS of the Commercial Shearing & Stamping Co., manufacturers of pressed metal products and hydraulic equipment, recently visited the Cincinnati Milling Machine Co. to examine machines they have purchased. E. D. Vancil, vice president of the Cincinnati Machinery Div., second from right, demonstrates operation of a 12" Hydroform machine to Commercial Co. executives, left to right, Robert Procter, vice-president-general manager; Herbert Wollison, vice-president; Ward Beecher, vice-president, and Charles B. Cushwa, Jr., president.

Cross opens engineering school

The Cross Co., Detroit, inaugurated, July 16, an engineering school specifically organized to train machine designers for the firm's automation machinery and special machine tool building operations. Joseph H. Cohen has been named supervisor of the new activity.

Students will be subjected to a concentrated learning program for a period of 26 weeks and will then be transferred to productive work in the company's engineering department. Every six months a new group will be invited to join the school.

The program is not a substitute for an engineering degree. All trainees will

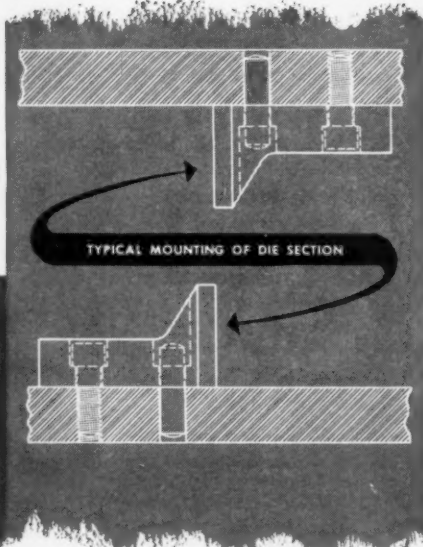
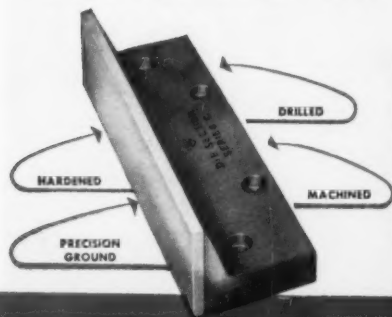
be urged to complete their formal engineering schooling at night, following the first six months period.

Training will include sessions to familiarize the students with standard and special machine tools, engineering fundamentals and drafting techniques. Emphasis is also being placed on working habits, dress and personal conduct in business. Everything is focused on what the young engineer should know and do to get ahead in the business world.

Crowningshield-Harris sold

Crowningshield-Harris Co., Inc., manufacturers of milling machines in Greenfield, Mass. for 50 years, has been bought by a new corporation, headed by Francis J. Sweeney, president and Daniel J. Sweeney, sales manager.

Reduce Your Die Building Time...



Standardized Die Sections

Standardized Die Sections manufactured by R-B eliminate all of your machining, drilling, hardening and grinding. For, these die sections are entirely prefabricated and ready for mounting on your die shoes . . . they will substantially reduce your die building time.

Series A, B & C die sections have cutting edges of tool steel which are hardened and precision ground. Bases are of mild steel to permit drilling of dowel pin holes.

Series AA, BB & CC die sections are not hardened, have wider lands and are of the same general construction as series A, B & C. These extra wide lands permit contouring before hardening. Die sections in both series are available in various lengths and heights.

TOOL STANDARDIZATION is the basis for saving production time. With R-B you get the accepted standard of the sheet metal industry—in standard design features that save in engineering, die construction and operation.

Use R-B Engineering Service for Your Piercing Problems



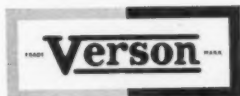
RICHARD BROTHERS PUNCH DIVISION
ALLIED PRODUCTS CORPORATION

DEPT. EN

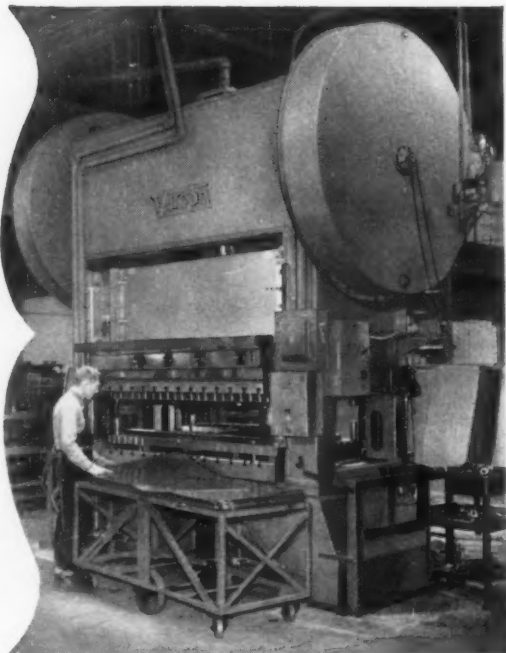
26484 CAPITAL AVENUE

DETROIT 26, MICHIGAN

150 TON



DOUBLE CRANK PRESS



forms eight 20-gauge steel furnace side panels per minute

An average of sixteen hours a day, six days a week, this Verson 150 ton Press performs one blanking and two forming operations on 20-ga. cold rolled steel. Blanking or forming is performed on eight gas furnace cabinet side panels for Lennox Industries, Columbus, Ohio, every minute that this versatile Verson Double Crank Press is in operation.

Production dependability is built into every Verson Press. More than thirty years of "know how" and the most modern facilities available enable us to build presses to meet the most rigid requirements.

Put Verson facilities to work for you! Send an outline of your production problems today . . . we will be happy to provide specific recommendations.



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9303 S. Kenwood Avenue, Chicago 19, Illinois
So. Lamar at Ledbetter Drive, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES
TOOLING • DIE CUSHIONS • Verson-WHEELON HYDRAULIC PRESSES

Circle No. 346 on Card, Opposite Page 65

Look at all the

**NEW
STOCK
SIZES**

of
**Flat Ground
Die Steel**

FREE WALL CHART!

Ask your **SIMONDS**
DISTRIBUTOR for a copy
of this New Chart (18" x 31")
giving full range of Stock
Sizes now available

SIMONDS SAW AND STEEL CO. **DIE STEEL**

IMMEDIATE DELIVERY
STOCKY 10000

SIMONDS

STOCK SIZES

OIL HARDENING		AIR HARDENING		OIL HARDENING		AIR HARDENING	
Size	Stock	Size	Stock	Size	Stock	Size	Stock
3 32	7 64	9 64	11 32	13 64	15 32	17 64	19 32
21 64	23 32	25 64	27 32	29 64	31 32	33 64	35 32
37 64	39 32	41 64	43 32	45 64	47 32	49 64	51 32
53 64	55 32	57 64	59 32	61 64	63 32	65 64	67 32
69 64	71 32	73 64	75 32	77 64	79 32	81 64	83 32
85 64	87 32	89 64	91 32	93 64	95 32	97 64	99 32
101 64	103 32	105 64	107 32	109 64	111 32	113 64	115 32
117 64	119 32	121 64	123 32	125 64	127 32	129 64	131 32
133 64	135 32	137 64	139 32	141 64	143 32	145 64	147 32
149 64	151 32	153 64	155 32	157 64	159 32	161 64	163 32
165 64	167 32	169 64	171 32	173 64	175 32	177 64	179 32
181 64	183 32	185 64	187 32	189 64	191 32	193 64	195 32
197 64	199 32	201 64	203 32	205 64	207 32	209 64	211 32
213 64	215 32	217 64	219 32	221 64	223 32	225 64	227 32
229 64	231 32	233 64	235 32	237 64	239 32	241 64	243 32
245 64	247 32	249 64	251 32	253 64	255 32	257 64	259 32
261 64	263 32	265 64	267 32	269 64	271 32	273 64	275 32
277 64	279 32	281 64	283 32	285 64	287 32	289 64	291 32
293 64	295 32	297 64	299 32	301 64	303 32	305 64	307 32
309 64	311 32	313 64	315 32	317 64	319 32	321 64	323 32
325 64	327 32	329 64	331 32	333 64	335 32	337 64	339 32
341 64	343 32	345 64	347 32	349 64	351 32	353 64	355 32
357 64	359 32	361 64	363 32	365 64	367 32	369 64	371 32
373 64	375 32	377 64	379 32	381 64	383 32	385 64	387 32
389 64	391 32	393 64	395 32	397 64	399 32	401 64	403 32
405 64	407 32	409 64	411 32	413 64	415 32	417 64	419 32
421 64	423 32	425 64	427 32	429 64	431 32	433 64	435 32
437 64	439 32	441 64	443 32	445 64	447 32	449 64	451 32
453 64	455 32	457 64	459 32	461 64	463 32	465 64	467 32
469 64	471 32	473 64	475 32	477 64	479 32	481 64	483 32
485 64	487 32	489 64	491 32	493 64	495 32	497 64	499 32
501 64	503 32	505 64	507 32	509 64	511 32	513 64	515 32
517 64	519 32	521 64	523 32	525 64	527 32	529 64	531 32
533 64	535 32	537 64	539 32	541 64	543 32	545 64	547 32
549 64	551 32	553 64	555 32	557 64	559 32	561 64	563 32
565 64	567 32	569 64	571 32	573 64	575 32	577 64	579 32
581 64	583 32	585 64	587 32	589 64	591 32	593 64	595 32
597 64	599 32	601 64	603 32	605 64	607 32	609 64	611 32
613 64	615 32	617 64	619 32	621 64	623 32	625 64	627 32
629 64	631 32	633 64	635 32	637 64	639 32	641 64	643 32
645 64	647 32	649 64	651 32	653 64	655 32	657 64	659 32
661 64	663 32	665 64	667 32	669 64	671 32	673 64	675 32
677 64	679 32	681 64	683 32	685 64	687 32	689 64	691 32
693 64	695 32	697 64	699 32	701 64	703 32	705 64	707 32
709 64	711 32	713 64	715 32	717 64	719 32	721 64	723 32
725 64	727 32	729 64	731 32	733 64	735 32	737 64	739 32
741 64	743 32	745 64	747 32	749 64	751 32	753 64	755 32
757 64	759 32	761 64	763 32	765 64	767 32	769 64	771 32
773 64	775 32	777 64	779 32	781 64	783 32	785 64	787 32
789 64	791 32	793 64	795 32	797 64	799 32	801 64	803 32
805 64	807 32	809 64	811 32	813 64	815 32	817 64	819 32
821 64	823 32	825 64	827 32	829 64	831 32	833 64	835 32
837 64	839 32	841 64	843 32	845 64	847 32	849 64	851 32
853 64	855 32	857 64	859 32	861 64	863 32	865 64	867 32
869 64	871 32	873 64	875 32	877 64	879 32	881 64	883 32
885 64	887 32	889 64	891 32	893 64	895 32	897 64	899 32
901 64	903 32	905 64	907 32	909 64	911 32	913 64	915 32
917 64	919 32	921 64	923 32	925 64	927 32	929 64	931 32
933 64	935 32	937 64	939 32	941 64	943 32	945 64	947 32
949 64	951 32	953 64	955 32	957 64	959 32	961 64	963 32
965 64	967 32	969 64	971 32	973 64	975 32	977 64	979 32
981 64	983 32	985 64	987 32	989 64	991 32	993 64	995 32
997 64	999 32	1001 64	1003 32	1005 64	1007 32	1009 64	1011 32

STOCK SQUARE SIZES

WIDEST SELECTION OF STOCK SIZES EVER OFFERED!

Now you can get HUNDREDS of NEW STOCK SIZES of Simonds high-grade, precision-ground tool and die steel . . . sizes that save you more time and money . . . sizes that formerly were special but now are available from stock at regular prices. Now you can get "1001 sizes for 1001 uses" . . . with your choice of OIL or AIR Hardening type steel in 18" and 36" lengths.

OIL HARDENING TYPE — Non-deforming, spheroidize-annealed for best machinability and consistently uniform hardenability — from Simonds' own steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. Individually packaged (18" and 36" lengths) with simplified heat treating instructions.

AIR HARDENING TYPE — Non-deforming, spheroidize-annealed, 5% chrome — more wear-resistant yet easy to machine and heat treat with uniformly excellent results — another product of Simonds steel mill. Decarburization and surface defects removed. Wide hardening range. Individually packaged with heat treating instructions.

Get full information . . . **NEW WALL CHART** . . . and Immediate Delivery . . . from **YOUR SIMONDS DISTRIBUTOR**

SIMONDS
SAW AND STEEL CO.
PITCHBURG, MASS.

FLAT GROUND

DIE STEEL

Factory Branches in **Boston, Chicago, San Francisco and Portland, Oregon** • Canadian Factory in **Montreal, Que.**
Simonds Divisions: **Simonds Steel Mill, Lockport, N. Y.** • **Simonds Abrasive Co., Philadelphia, Pa.** and **Arvida, Que., Canada**

HEAVY-DUTY AIR (or Oil) CLAMPS

*Never send a boy
TO DO A MAN'S
JOB*

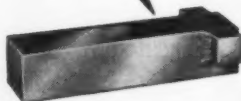


Design with clamps rated to the job they must do. Knu-vise heavy-duty clamps possess the extra margin of life needed because they're rugged, strong, built to stand abuse.

Knu-vise heavy-duty clamps are air (or oil) and hand operated—have either solid or channel bars. Featured are:

1. Hardened and ground bearing bolts
2. Self-locking nuts for minute adjustment of parts
3. Toggle bars from C.R.S. bars
4. Easy and complete replaceability of parts

SOLID BAR

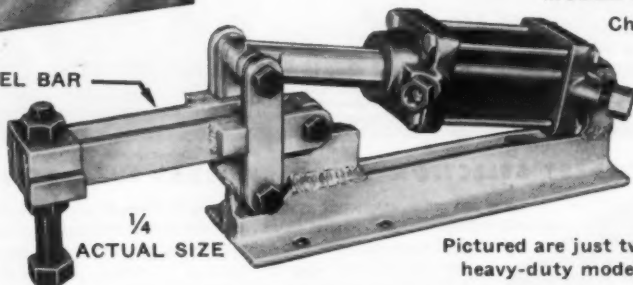


MODEL AOS-400 (HD)—Solid Bar

MODEL AO-400 (HD)

Channel Bar

CHANNEL BAR



$\frac{1}{4}$
ACTUAL SIZE

Pictured are just two of several heavy-duty models available.

In a high production automobile plant, a Lapeer installation lasted for more than 1,300,000 cycles. After a small repair, the installation has passed the 2,000,000 mark and is still going strong. Better write today for complete information. No obligation, of course.

Manufacturers of over 150 models of manually and air-operated clamps and pliers

**KNU-VISE
PRODUCTS**

LAPEER MANUFACTURING CO.

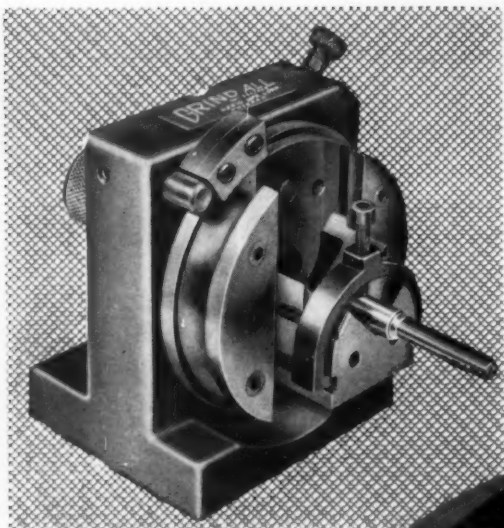
3052 DAVISON ROAD

LAPEER, MICHIGAN

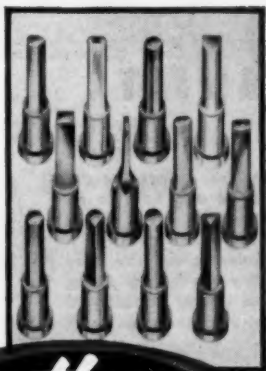
WESTERN DIVISION: 422 Magnolia, Glendale, California • CANADIAN DIVISION: Higginson Engr., Hamilton, Ontario

Circle No. 348 on Card, Opposite Page 65

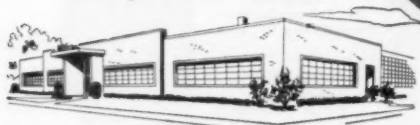
MACHINE and TOOL BLUE BOOK



Perforator Grinding
 $\pm .0002$ with greatest speed
 accuracy and range



**made by the house
 that precision built**



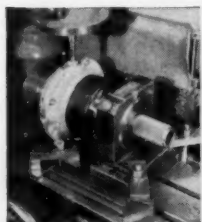
*Headquarters for the Finest ...
 Precision Tools*

Consult our engineering
 staff when you need
 precision tools or dies.
 Send for free catalog.



Here is higher accuracy, greater range and
 maximum speed in grinding perforators.
 Meets the requirement for a more versatile
 perforator grinding attachment. Grinds
 many irregular shapes concentric with shank.

Also performs other functions such as
 light milling and boring fixture, inspection
 tool, etc.



BORING FIXTURE



INSPECTION TOOL

Circle No. 349 on Card, Opposite Page 65

SHELDON

CHICAGO U. S. A.

BUILT . . . to Turn out PROFITS

Sheldon Lathes are designed and built to do accurate lathe work rapidly and profitably. Moderate in price they have the collet, swing and power capacity to do most toolroom work.



UM56P
13" Swing Lathe
34" Between Centers
Rapid Shifting "U" Drive

UM56P
\$161500
Base Price
F.O.B. Chicago

Design

Features:

- Large and wide "Zero Precision" Tapered Roller Spindle Bearings—permit operation at all speeds, retain accuracy, end expensive bearing maintenance costs.
- 54-pitch Gear Box—gives both standard and many hard to get thread ratios.
- Large Micrometer Dials—Make accurate operation easier.
- Extra Collet Capacity—1½" hole through spindles available on 10", 11" and 13" swing lathes.
- More Power to Spindle—Efficient drives with bigger motors and double neoprene V-belts to spindle.

OPTIONAL FEATURES AT EXTRA COST

include: Hardened ways, Long Tapered Key Drive Spindles, 4" D1 Camlock Spindles bed turrets, collet attachments, and other production and toolroom accessories. Lathes available with a choice of "Bench," "Cabinet" or "Pedestal" mountings.

Write for New Catalog G-55

SHELDON MACHINE CO., Inc.

4242 N. Knox Ave.

Chicago 41, Illinois

Circle No. 350 on Card, Opposite Page 65



WHAT'S NEW IN METALWORKING

MACHINE AND TOOL

blue book

Edited by D. M. Carlson

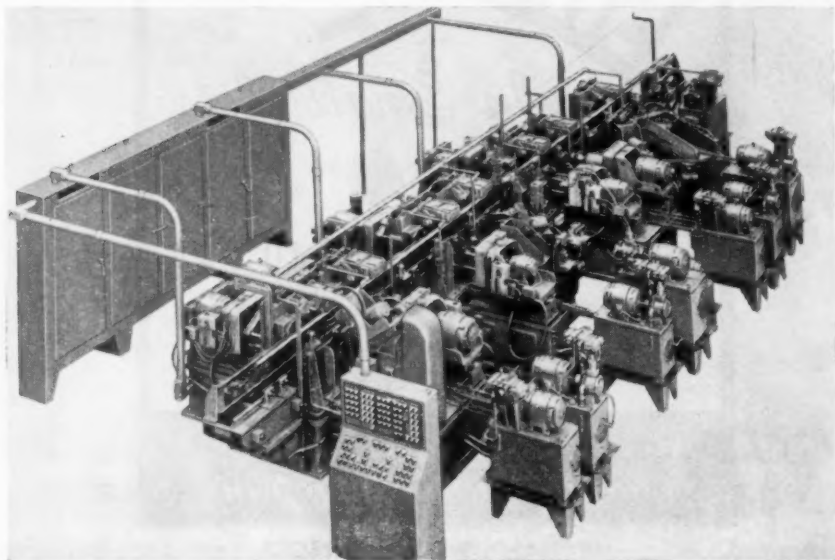
200 Torque Converter Housings Per Hour

Sectionalized bases to simplify processing changes, automatic depth-inspection of all holes before tapping, automatic lubrication of all moving parts, mist lubrication to all spindles to maintain uniform temperature in heads, and all spindles arranged for pre-setting of cutting tools—these are some of the more important features of this Buhr Economatic.

Operations include 36 drilling, two combination drilling and reaming, seven

counter-sinking, two reaming, one boring, seven inspection and seven tapping. The twelve stations are one for loading, seven for machining (including one for mechanical inspection), three for visual inspection and one for unloading.

Other features: All standard and special machine parts completely interchangeable, construction to J. I. C. hydraulic and electrical standards, hardened-and-ground automatically-lubricated steel ways, tapping spindles

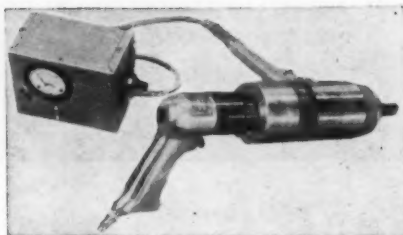


of the individual-lead-screw type with precision-ground and hard-chrome-plated threads, and multiple heads of Buhr ball-bearing construction with shaved gears and broached-and-splined drives. Buhr Machine Tool Co., 835 Greene St., Ann Arbor, Mich.

Use ACTION Card, opposite page 64. Circle No. 81

Precision torque wrench

The Nelson precision torque wrench is a machine-driven tool transmitting



power through the Magnefluid drive. Torque is transmitted from one disk

THE NATION'S VERY BEST FACILITIES

for

STAMPINGS

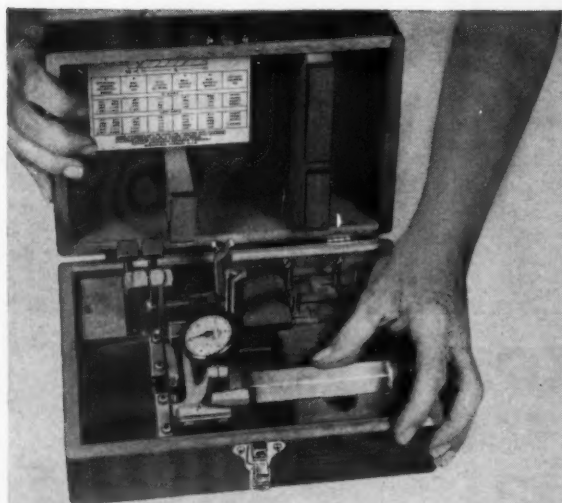
In Small Lots

LOWEST POSSIBLE DIE COST

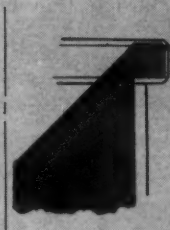
DAYTON ROGERS
Manufacturing Company

MINNEAPOLIS 7C, MINNESOTA

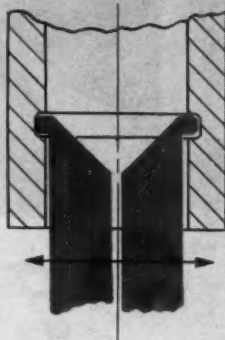
Circle No. 351 on Card, Opposite Page 65



Full line contact for long segment wear.



Straight line motion guarantees accurate measurement over full range.



BRYANT GROOVE GAGE

This Kit Checks Grooves for

O-Rings — .421 to 4.870 Diameter.

Snap Rings — .267 to 5.266 Diameter.

- Line contact assures long segment life
- No bearings or sliding members to wear
- Selected Northern hardwood case
- Immediate shipment from stock

Special segments available for checking non-standard grooves, concentricity of groove to bore, or depth of groove to face.

Groove segments can also be used on the Bryant B-21 Bench Gage.

WRITE FOR FULL INFORMATION ON BRYANT GAGES

Bryant Gage & Spindle Division

P. O. Box 620-E, SPRINGFIELD, VERMONT

Division of Bryant Chucking Grinder Company

Circle No. 352 on Card, Opposite Page 65

to another with no mechanical connection, insuring reliable operation, long tool life.

There are virtually no wearing parts in the torque transmitting elements. When each nut is run up and seated, in one quick operation, it will be torqued to whatever specification is demanded. Repetition accuracy to one inch pound.

Selection of any torque in tool range

is through dial setting. Precision torque from 6 to 300 lb. Swift Tools Corp., Dept. RB, 3201 S. Prairie, Sioux Falls, S.D. Use ACTION Card, opposite page 64, Circle No. 82

Foot warmer

Employees on the production line, in the office or laboratory work with increased efficiency when provided with portable foot warmers. These 14 x 21" neoprene rubber mats throw off a gentle

DAZOR FLOATING LAMPS

Fit the Lighting
to Each User
and Each Job



Top-Mounted Reflector

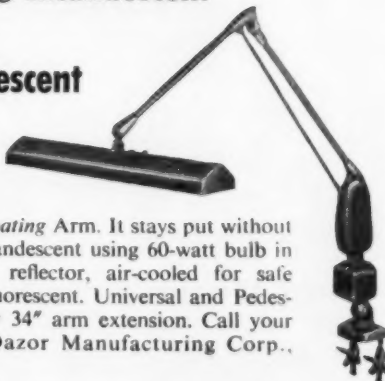


Side-Mounted

Air-Cooled Incandescent or Fluorescent

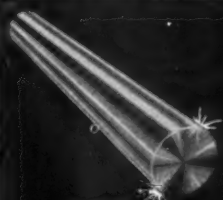
People . . . jobs . . .
lighting needs differ.
Let each employee

control light location with the Dazor *Floating Arm*. It stays put without locking. Choice of Incandescent using 60-watt bulb in top- or side-mounted reflector, air-cooled for safe handling; or 2-tube Fluorescent. Universal and Pedestal models with 24" or 34" arm extension. Call your Dazor distributor. Dazor Manufacturing Corp., St. Louis 10, Mo.



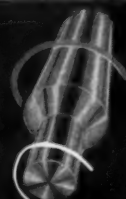
Circle No. 353 on Card, Opposite Page 65

PIVOT punch introduces cylindrically ground punches with **MORE QUALITY** features than **EVER BEFORE**



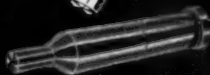
HIGH SPEED STEEL

Greater impact strength and wear-resistance.



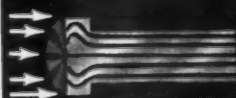
GUARANTEED CONCENTRICITY

between point and shank within .0002, T.I.R.



LEAD GROUND ON THE SHANK

for perfect alignment in retainer holes.



HOT HEAD FORGING

(On Shoulder Punches) eliminates head fracture.



48-HOUR DELIVERY

Complete stock of all standard sizes.



The SAME prices as competitive punches!

NOW!
48 Hour
(IN STOCK)
Delivery!

WRITE FOR COMPLETE CATALOG WITH PRICE LISTS.



pivot punch and die corp.

NORTH TONAWANDA, N. Y.

Only

THRIFTMASTER Universal Joint Type DRILL HEADS

have these exclusive* features

*Standard Full Ball Bearing Construction, Including Spindles

Driving assembly is Full Ball Bearing mounted with 3 Bearings on each spindle. Thrust load carried by radial thrust bearings.



*Standard Slip-On and Slip-Off Template Construction

For accurate setting and locating spindle brackets are machined to receive slip-on and slip-off template.

6 Standard Models . . . Models U-608 and U-1000—Ball Bearing. Models U-620B and U-1012B—Plain Bearing, 11/16" or 1/2" min. centers. Models U-608-BS and U-1000-BS—Ball Bearing Gear Case, Plain Spindles.

Semi-Standard Heavy Duty Full Ball Bearing . . . 1/2" in Cast Iron—1-7/16" min. centers—7 1/8" or 9 3/4" dia.

1/4" in Steel—1-13/16" min. centers—7" or 9 3/8" dia.

Also Larger Adaptations and Full Line of Fixed Center Drill Heads.

WRITE FOR FULL INFORMATION



Subsidiary of
Thomson Industries, Inc.

THRIFTMASTER Products Corporation

1030 N. PLUM STREET
LANCASTER, PENNA.

Also Makers of

DORMAN AUTOMATIC REVERSE TAPPERS
Circle No. 355 on Card, Opposite Page 65

warmth that keeps workers comfortable. They use less power than a 75 watt light bulb. General Industrial Co., 5750 N. Elston Ave., Chicago, Ill.

Use ACTION Card, opposite page 64. Circle No. 83

OBI press features extra throat depth

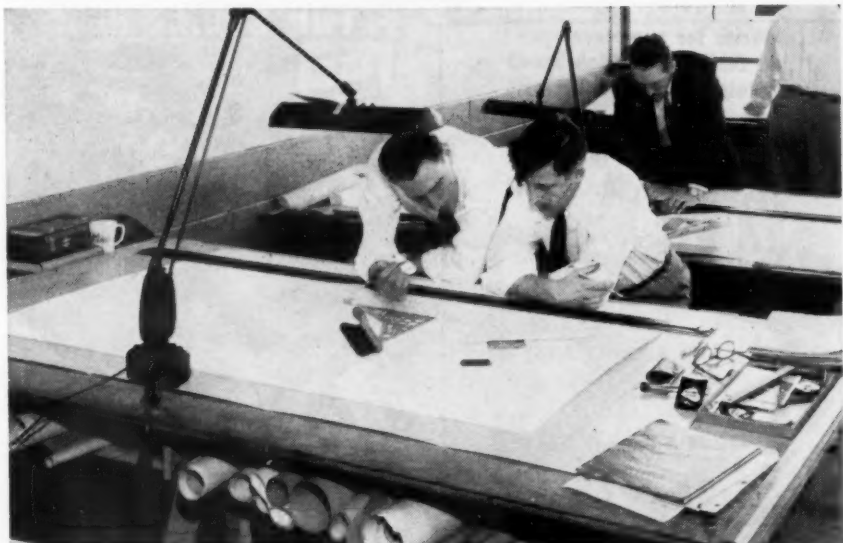
The semi-steel frame of the 3F 25-ton OBI press is heavily reinforced and extremely rugged. It has roller bearing flywheel, extra heavy clutch (which can be set for single stroke or continuous operation), generous bearings that are closely mounted to practically eliminate shaft deflection, and full-length V-type ram guides precision ground to maintain true alignment. Throat clearance is 15 inches (from ram center to frame).

Simplicity has been stressed to facilitate operation and maintenance; high precision machining assures uniform presswork. Service Machine Co., Dept. HS, 2310 W. 70th St., Chicago 20.

Use ACTION Card, opposite page 64. Circle No. 84



MACHINE and TOOL BLUE BOOK

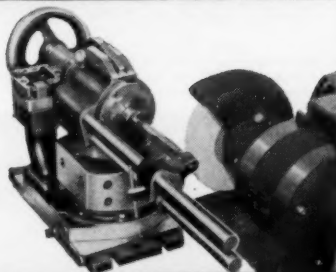


MONEY MAKING DECISION!

"GRIND WITH R-O FORM RELIEF". This legend appears on more and more cutting tool prints each year. A fast growing number of tool designers, tool process men and tool grinding room foremen are becoming aware of the potentials in better work and longer tool life that result from sharpening both standard and special cutters with the R-O.

Write for information and prices.

GRINDER DIVISION
ROYAL OAK TOOL & MACHINE CO.
29800 Stephenson Hy. Royal Oak, Mich.



RO
UNIVERSAL
FORM RELIEVING
FIXTURE



R-O Grinder

Write for new catalogue
of Carbide and High Speed
Rotary Files and Burrs.

Save Dollars by Using
Our Re-Sharpening Service



MFGR'S OF
ROTARY FILES
COUNTERSINKS
HIGH SPEED CUTTERS
TUBE BURRING FILES

BEAVER
ROTARY FILE COMPANY
404 E. SLAUSON AVE.
ADAMS 1-0165
LOS ANGELES 11 CALIF.

Circle No. 357 on Card, Opposite Page 65

FLYNN BORING HEADS



LEADING NAME IN
BORING HEADS FOR 40 YEARS
19 MODELS *Write for catalog*

FLYNN MANUFACTURING CO.
133 FLOWERDALE AVE. • DETROIT 20, MICH.

Circle No. 358 on Card, Opposite Page 65



Engineered Live Centers

... A properly designed Live Center is one of the fundamentals of setting up a job and requires a specialist's experience. Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action that compensates for expansion due to heat shock and excessive thrust loads—reducing wear to a minimum. Send us your blueprints and specifications—we will see that your job is set up with the right Live Center. Standard shanks with Morse taper carried in stock.

STURDIMATIC
TOOL COMPANY

380 F STREET • DETROIT 16, MICH.

Circle No. 359 on Card, Opposite Page 65

Metal Cutting Circular Sawing Machine Power Squaring Shears

The Barson metal cutting circular sawing machine makes clean, accurate straight and mitre cuts. The machine is offered in two sizes. Size I cuts material up to 2- $\frac{3}{8}$ " dia.; Size II, up to 3- $\frac{1}{2}$ ". Size I weighs 115 lb.; Size II, 144 lb. Motor size of No. I is 0.5 hp; No. II, 0.85 hp.

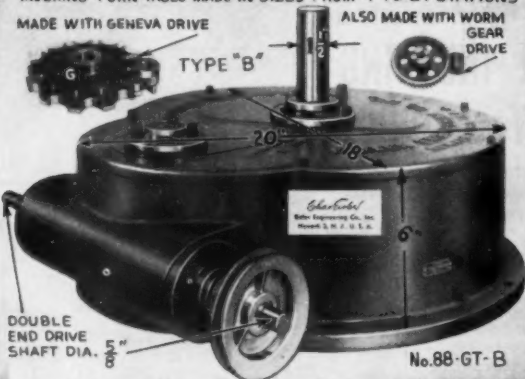
Machine also is made in two types: Type A, for iron and steel, has a speed of 105 fpm; Type B, for nonferrous metals, has a speed of 295 fpm.

Gears and shaft run in oil. Oil stand is always visible. Adjustment of the saw shaft is simple and exact. The vise can



INDEXING MACHINERY — CAMS — GENEVA GEARS — TURNTABLES

INDEXING TURN TABLE MADE IN SIZES FROM 4 TO 24 STATIONS
MADE WITH GENEVA DRIVE



EISLER INDEXING TURNTABLE



MFG. REP. WANTED
DR. CHARLES EISLER ME. FOUNDER

ASK FOR CATALOG No. 88-57
CHARLES EISLER, JR. PRES.

EISLER ENGINEERING CO., INC.
762 SOUTH 13th STREET

NEWARK 3, NEW JERSEY

Circle No. 360 on Card, Opposite Page 65

be arranged for cutting tubes, at no extra charge.

Saw is manufactured in Germany by Beinhoff & Co., Hamburg-Wandsbek 16.

Use ACTION Card, opposite page 64, Circle No. 85

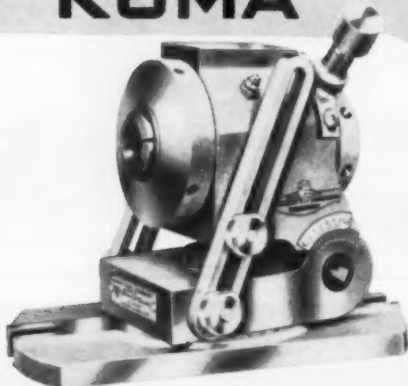
Water conditioned without chemicals

This water conditioner eliminates and prevents scale and corrosion formations



in boilers and water systems without the use of chemicals. For use on boilers, air conditioning and refrigerating systems, laundries and other industrial applications where water problems exist,

KUMA



40% FASTER INDEXING
WITH **ACCURACY to .0003**

PRECISION and SPEED best describes the KUMA dividing head, the versatile tool with 1001 uses. Equipped with precision Timken bearings and Garlock oil seal.

- Concentricity of bore .0003.
- 0 to 90° elevation.
- 360° swivel of head on base.
- 5C collet capacity.
- Uses interchangeable index plates.

SEND FOR COMPLETE LITERATURE

PRECISION
UNIVERSAL
DIVIDING
COLLET
HEAD



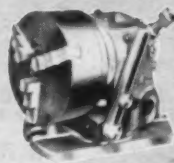
ANGLE DRESSER



COLLET CLOSER



RADIUS DRESSER



CHUCK ADAPTER



KUMA TOOL CO.

DIVISION OF Precision Tool Corporation

4712 S. Kenwood Ave. Chicago 15, Ill.

Circle No. 361 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK



RACINE

LOW COST...LARGE CAPACITY

Operating Features

- 1 **HYDRAULIC FEED AND CONTROL SYSTEM**—Pressures are controlled by a single graduated dial. Rate of feed is controlled by a small throttling valve.
- 2 **SWIVEL VISE** — Quick-acting self-positioning type for cutting any angles up to 45°.
- 3 **BEARINGS**—Extra large bronze bushings accurately press fitted are used on all rotary shafts.
- 4 **AUTOMATIC KNOCK-OUT**—Saw frame automatically rises to its highest point and motor is stopped at the completion of each cut.

MODEL 816 UTILITY SAW

A fully automatic hydraulically operated all-purpose saw that will handle the full range of general cut-off work.

Any metal from tough tool steel to mild bars, tubing and structural shapes up to 8" x 16" can be cut with speed and precision.

No clutch, trains of gears, levers or ratchet devices are used. The Racine Model 816 is designed with a minimum of easily accessible precision-made working parts that assure years of dependable operation.

Write for catalog giving specifications on RACINE'S complete metal cutting saw line.



RACINE HYDRAULICS & MACHINERY, INC.

2054 Albert St., Racine, Wisconsin

Circle No. 362 on Card, Opposite Page 65

it prevents scale and corrosion by imparting added energy to the atoms of the water solution. There is no moving part, no expensive maintenance or servicing.

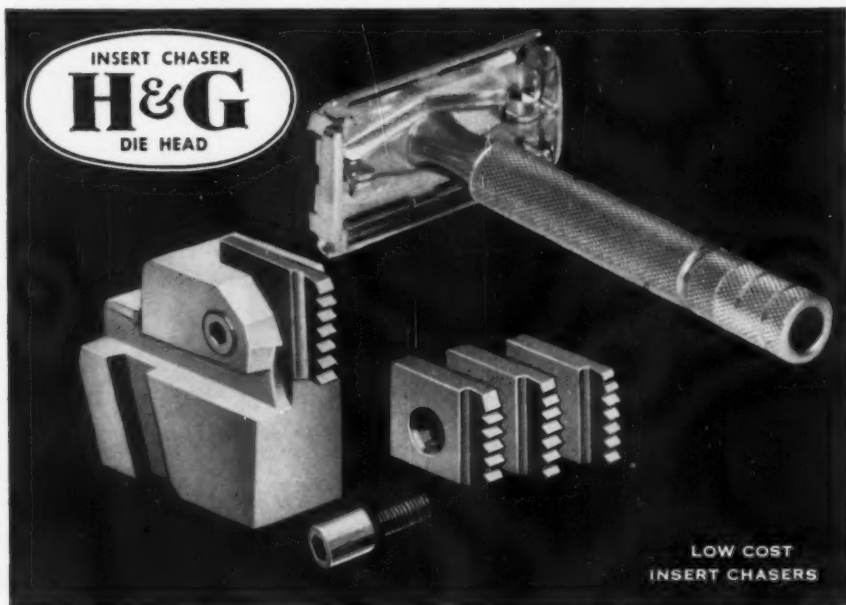
Water conditioner is manufactured in sizes handling from 6.5 to 1760 gallons per minute for connection with corresponding standard iron pipe sizes ranging from $\frac{3}{4}$ " to 12". Larger sizes are available. Packard Water Conditioner

Div., Inc., 2220 W. Beaver St., Jacksonville 9, Fla.

Use ACTION Card, opposite page 64. Circle No. 86

Three and four flute core drills

Three and four flute core drills, constructed so that the center portion of the drill does not cut, are specifically designed for the enlarging of holes. They facilitate the use of greater feeds, af-



FOR LESS THAN \$45 YOU GET 12 SETS, EACH SET GROUND READY TO GO

Men would not accept either idea at first . . .

INSERT CHASERS SAVE UP TO 33%

Insert chasers are like safety razor blades; they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than \$45 you get a dozen sets of $\frac{1}{16}$ -16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime. FREE: "Unified and American Screw Thread Digest."

THE EASTERN MACHINE SCREW CORPORATION, 25-45 Barclay St., New Haven, Conn.

Circle No. 363 on Card, Opposite Page 65

For control of cutting costs



CIRCOLOY Saws

Circoloy Saws do jobs too tough for HSS, not tough enough for carbide — enabling you to cut costs by restricting use of carbide and HSS to purposes they serve best. Circoloy, supplied exclusively by Circle R, widely outperforms HSS in terms of longer life, longer production runs, superior cutting. For less down time in automation or regular production, specify Circoloy Saws. See our Catalog N for details.

**Circoloy assures the
sustained precision performance
indispensable to automation.**

Consult CIRCLE R Specialists in —

Burbank
Chicago
Cleveland
Dayton
Detroit

Hackensack
Indianapolis
Kansas City
Milwaukee

New York City
Philadelphia
Montreal
Phoenix

Pittsburgh
Providence
Rochester
St. Louis
Westbury, L.I.

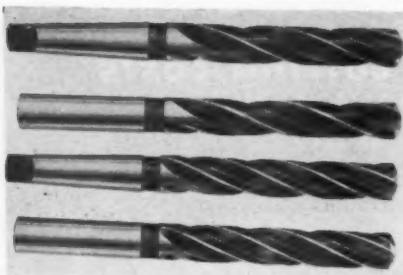
METAL SLITTING SAWS
COPPER SLITTING SAWS
SCREW SLOTTING SAWS
COMMUTATOR SLOTTING SAWS
JEWELERS' SLOTTING SAWS
CUT OFF SAWS • CIRCULAR
KNIVES & ROTARY SHEAR
BLADES • CIRCOLOY STEEL
SAWS • SOLID & TIPPED
TUNGSTEN CARBIDE SAWS
COMBINED DRILLS & COUNT-
ERSINKS • CENTER REAMERS



CIRCULAR TOOL CO., INC.

PROVIDENCE 5, RHODE ISLAND

Specialists in Circular Cutting Tools Since 1923



ford smooth, accurate finishes.

Drills are furnished in straight and taper shanks. Sizes range from 1/4" to 3" in taper shanks and from 1/4" to 2" in straight shanks. Whitman & Barnes, Dept. JS, 40600 Plymouth Rd., Plymouth, Mich.

Use ACTION Card, opposite page 64. Circle No. 87

Mobile band saw

The Kalamobile, a mobile band saw, is available in two styles: 1. Model



NEW! NOSE ADJUSTMENT for **GREEN** master feed fingers

designed especially for
the multiple spindle
screw machine

The new design makes it possible to adjust the fingers at the machine. The nose cap can be easily removed and tension of the fingers loosened or tightened with a minimum of lost time. Synthetic rubber inserts grip any size or kind of bar stock and protect it from scratching or scoring. Tension is uniform . . . prevents distortion when thin-wall tubing is used. Simple construction eliminates maintenance.

Catalog sheet and price information furnished on request.

GREEN MANUFACTURING CO.
122 S. PRAIRIE AVE. • ROCKTON, ILLINOIS

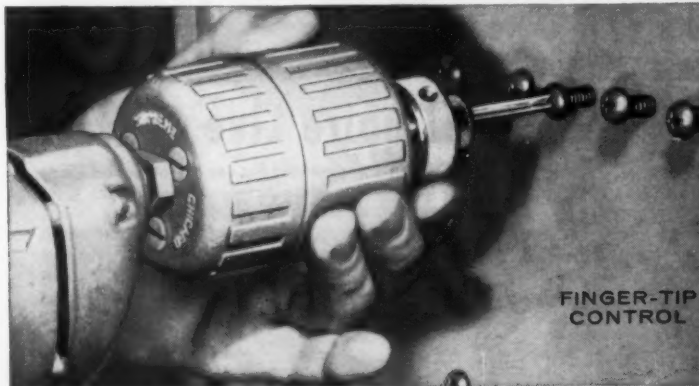
**Greatest new tool in years for
maintenance and production**

a high quality, low cost
REVERSIBLE
SPEED REDUCER

Fits all portable drills ... re-
duces speed, increases torque
seven times. Ask your dis-
tributors to show you the ...

Supreme **Versamatic**

PROFESSIONAL MODEL
No. 4000-P
WITH YANKEE-TYPE BIT HOLDER



FINGER-TIP
CONTROL

COMPLETE 14-PIECE SET... ONLY \$24.95
Engineered and manufactured by the makers of

Supreme Chucks
BRAND

UP FRONT on America's leading power tools

SUPREME PRODUCTS CORP. 2222 S. CALUMET, CHICAGO, ILLINOIS



DRIVES SCREWS



REMOVES SCREWS



RUNS NUTS BOLTS



ON OR OFF



SPEED REDUCTION



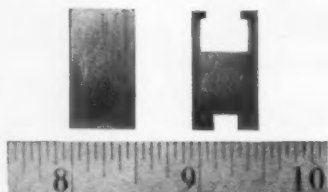
FOR DRILLING



DRIVES TAPS



REVERSE
removes taps
by power



Name of Part—Brush Holder
Material—Leaded Brass
Cuts—1/8x3/16x1/2 slot
1/4x3/8 "T" Slot with 1/4"
Neck

Above cuts previously done in 3 operations
 that took 20 seconds/Complete Piece
 Now done in one operation that takes 3 seconds/Complete Piece

Name of Conn. Mfr. On Request

THE F. HALLOCK COMPANY
 "BROACHING SPECIALISTS"
 116 Main Street Derby, Conn.

Circle No. 367 on Card, Opposite Page 65

LET HIGH-SPEED KNOW-HOW

- Increase Production
- Reduce Costs • Improve Quality

—NEW, NOISELESS RIVET SPINNER

The new noiseless, motor-driven Rivet Spinner is the latest addition to the High Speed Hammer line of cold riveting machines and stakers. Has rivet capacity to $\frac{1}{8}$ " diameter, spindle travel $\frac{3}{4}$ " adjustable downward. Two models . . . floor or bench, designed for either foot or air operation. Produces absolutely uniform assemblies at every cycle, increases operator's efficiency. Air operated model eliminates fatigue. High Speed Hammer provides **FREE ASSEMBLY ENGINEERING SERVICE**. Send parts and/or prints. We'll recommend the right operation covering tools, procedure, cost estimate and equipment to use. No cost or obligation.



HIGH SPEED HAMMER CO., INC.

311 Norton St., Rochester 21, N. Y.

We have the most complete line of riveting machinery and can recommend the correct type machine, tooled and ready, to go into operation upon receipt.

Circle No. 368 on Card, Opposite Page 65

The ONLY Live Center On Which Points May Be Interchanged to $\pm .0001$

Points Must Be
Ordered With
LIVE CENTER
To Achieve This
Degree Of
Accuracy.



Ask your local distributor or write direct for 26-page Catalog on Live Centers, Collets, Internal Collets, Draw Bars, and Turret Tool Posts.



Empire Live Centers

Quality engineered for use on lathes, grinders, and milling machines . . . Empire Live Centers are versatile, accurate, heavy duty. Tapered seats give consistent precision alignment . . . assure accuracy of .0001. Positive seal eliminates dirt, grit, cutting oils. Combination bearings absorb both radial and thrust loads.

Manufactured in all tapers: Morse, Brown & Sharpe, Jarno, and straight shank. Special shanks and points to order.

Empire Toolmaker's Set available in handrubbed American Walnut case.



ROYAL PRODUCTS, 84 Union Street, Mineola, L. I., N. Y. Pioneer 6-4245

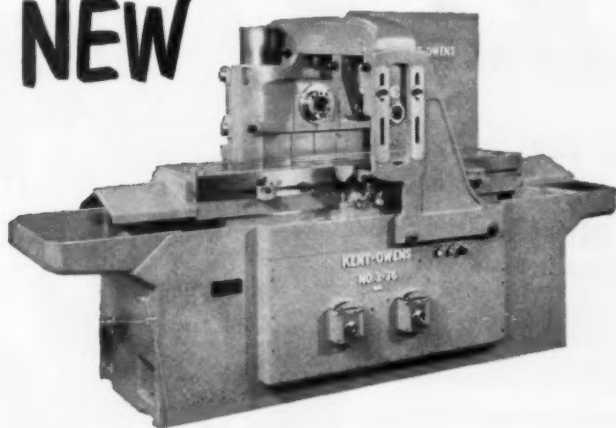
Circle No. 369 on Card, Opposite Page 65



M610D (dry) and 2. M610W (wet). The Kalamobile chassis is available for mounting any Model 610 metal cutting band saw now in service.

The chassis is rolled about on 12" solid rubber tired wheels. Collapsible handles are telescoped into the handle tubes, eliminating objectionable interference when the machine is in operation. Kalamazoo Tank & Silo Co., Dept. HS, 508 Harrison St., Kalamazoo, Mich. Use ACTION Card, opposite page 64. Circle No. 88

NEW



No. 3-36 HYDRAULIC MILLING MACHINE

Now the new No. 3-36 in the Kent-Owens line of Milling Machines offers you the same unexcelled milling accuracy, speed and dependability for *larger size work*.

This ruggedly constructed miller has 36" table travel ... 64" x 16" table ... full automatic hydraulic feed. Write for full specifications. Kent-Owens Machine Co., Toledo, Ohio.

Call on **KENT-OWENS**
for **MILLING MACHINES**

These refinements
on Ferracute's
new 110-ton

O.B.I.

mean more
profitable production

- 1 Box-type ram construction, gibbed front and back.
- 2 Air-operated, electrically controlled, interconnected clutch and brake.
- 3 Hydraulic inclining mechanism.
- 4 Bed arranged to accommodate die cushion.
- 5 Ram, air counterbalanced.
- 6 Floor-level, one-point lubrication.
- 7 Two lifting eyes mounted in press frame.

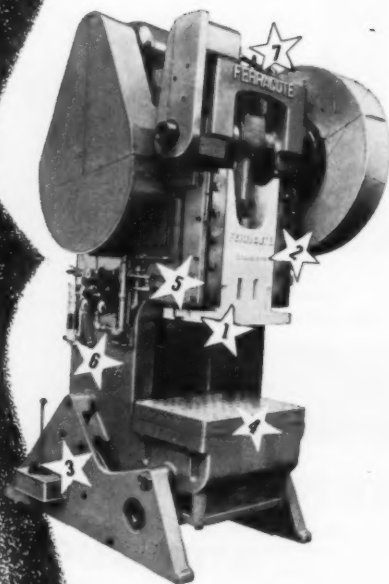
FERRACUTE

Write for complete information.

FERRACUTE MACHINE CO.

469 East Commerce Street, Bridgeton, N. J.

Manufacturers of Power Presses,
Press Brakes and Special Machinery



Holes **JIG GROUND** with *Vulcanaire*

Provide yourself with this inexpensive* instrument for use on your present equipment and JIG GRIND with a guarantee.



**YOUR
TOOL ROOM
IN DAYTON
45th YEAR**



A five station indexing fixture from Vulcan's Contract Tool Room (Your tool room in Dayton).

Using a jig borer index table with the Vulcanaire 5 indexing holes and 35 locating and clamping holes were JIG GROUND in place. Result — eliminated all close locating and dowelling of individual parts and of course hours of time.

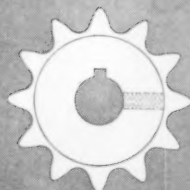
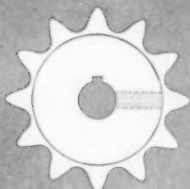
*Vulcanaire equipment pays for itself on the first job.

**Borrow
Vulcan's
instructive
movie on
jig grinding**

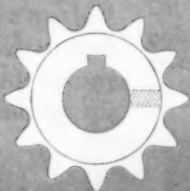
Services of YOUR TOOL ROOM in Dayton

Engineering, Processing, Designing . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and Size . . . Vulcanaire Grinding Heads . . . Motorized Rotary Tables . . . Plastic Tooling . . . Vulcanaire Jig Grinders.

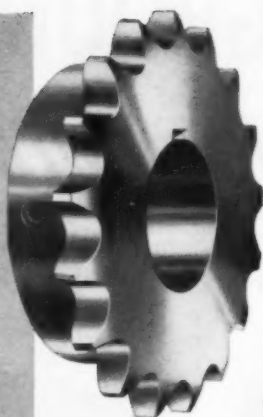
VULCAN TOOL CO. 710 Highland Ave. DAYTON 10, OHIO



76 TOOTH SIZES
321 STOCK BORES



7124
TRANSMISSION
PRODUCTS
FROM LOCAL STOCK
— AT FACTORY PRICES



NOW you can
ELIMINATE
BORING
EXPENSE

with **BOSTON** *gear*
STANDARD STOCK

BORED-TO-SIZE **SPROCKETS**

Complete with Keyway and Setscrew

FINISH BORED—READY TO INSTALL. Single width steel sprockets $\frac{3}{8}$ " Pitch through 1" Pitch — in 76 commonly used Tooth Sizes—with a full selection of finished bore diameters for each sprocket.

YOU SAVE EXPENSE of reboring, keyway cutting, drilling and tapping for setscrew . . . and you get **BOSTON GEAR** quality, the top standard for precision and performance.

OFF-THE-SHELF DELIVERY from your nearby **BOSTON GEAR** Distributor. Consult his factory-trained specialist for complete information on Sprockets for any drive. Ask for Catalog 56. Boston Gear Works, 81 Hayward St., Quincy, Mass.

Call your

BOSTON *gear*
DISTRIBUTOR

Speed **MULTIPLE CUTS**

**on vertical boring mills
with Davis 8-Position
Indexing Tool Holder**



MODEL B
Length 24 $\frac{1}{4}$ "
weight 210 pounds

1 HOLDER
SETUP

4 TOOLS
MOUNTED

8 INDEXED
POSITIONS



MODEL A
Length 21", weight 105 pounds

PRODUCTIVITY of your vertical boring mill—regardless of make or model—can be profitably increased with this new cost-cutting accessory.

Held in the machine ram head, the Davis Indexing Tool Holder mounts four square-shank cutter bits for successive operations without relocating the work. Also, it presents each tool either square with the work or inclined at a 45° angle, making it useful for a broad range of cuts. Indexing between operations is completed in a matter of seconds, sharply reducing floor-to-floor time. And substantial savings in machining time on multiple operations quickly repay cost of tool holder. Get complete information—learn how your vertical boring mill work can be made more profitable.

PROFIT-BUILDING ADVANTAGES

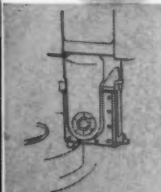
- ★ Accurately indexes to 8 positions in 45°
- ★ Completes 4 operations without changing tools or relocating work.
- ★ Supplied for right or left-hand ram heads
- ★ Bores, turns, faces, chamfers, and undercuts.

DAVIS

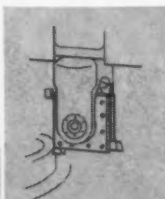
BORING TOOL DIVISION OF
Giddings & Lewis Machine Tool Company
Fond du Lac, Wisconsin



THE ONE NAME THAT CERTIFIES ULTIMATE PRECISION AND PRODUCTIVITY IN TOOLING



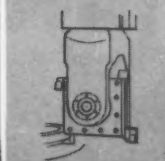
Holder with facing tool
presented to work.



Holder indexed 90° to
present turning tool.



Holder indexed at 45°
for chamfering.

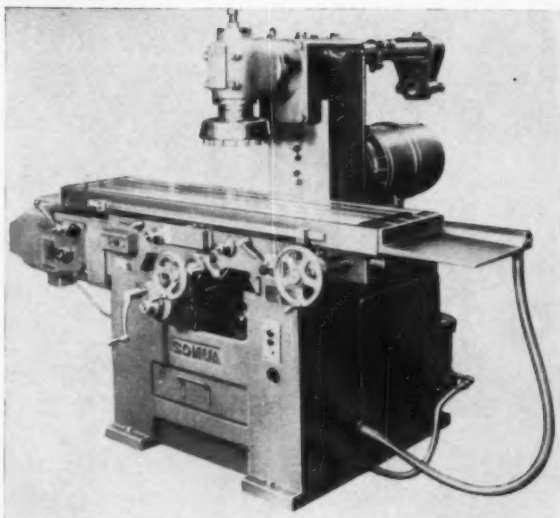


Tool holder indexed at
90° for undercutting.

French Milling Machine

Visitors this summer to the Barcelona and London-Olympia machine-tool shows were fascinated by something new in milling machines.

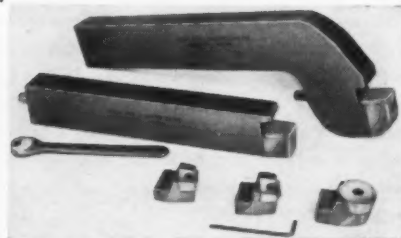
The two models exhibited looked like modified bed-type millers, but with a crosstravel contrary to traditional bed-type design. Also, the spindle projected from an extremely slender upright, where conventional milling machines make sure to provide a massive column. A further departure was the absence of the usual overhanging knee supporting the worktable. Instead, the entire bed had



been widened, and the table of the ma-

PRODUCTION TOOLS BY

APEX



"NO CLAPPER BOX DELAYS"

Holders with Carbide Plug Tools for heavy duty planing. Other shape tools to change to when operations require. No need to remove the holder to make the change.

Visit National Metal Exposition
Booth 2816, Cleveland, Ohio
October 8th - 12th

for complete display of holders, tools
and inserted tooth milling cutters for all
type machines.

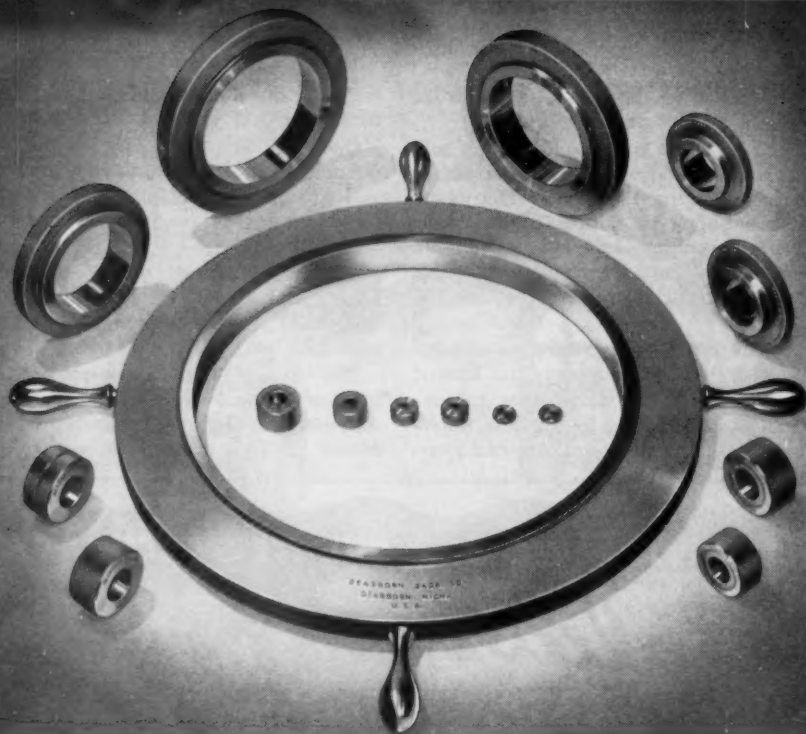
"APEX" holders have the original
tapered serrated seat for easy ad-
justment or replacement of tool.

CATALOGUE SENT UPON REQUEST

THE APEX TOOL & CUTTER CO., INC., SHELTON 14, CONN.

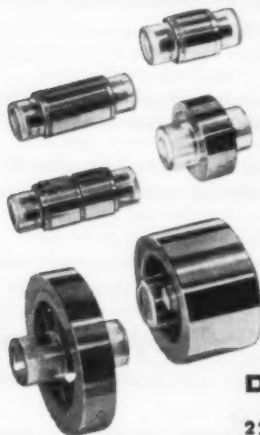
Circle No. 375 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK



For Finer Accuracy, Higher Quality, Lower Gaging Costs!

DEARBORN MASTER SETTING RINGS MASTER SETTING DISCS



When it comes to controlling internal and external work dimensions, you'll find it pays to set your production and inspection gaging equipment with Dearborn Master Rings and Discs. Produced to A.G.D. Standards, they are made of the finest quality steel... stabilized, ground, and precision lapped to specified size. All are subjected to rigid, 100% inspection under closely controlled laboratory conditions to assure the ultimate in uniformity and accuracy. And they are available with either steel or chromium plated gaging surfaces in a wide range of sizes to meet your particular requirements... Master Rings from .029" to and including 12.260", Master Discs from .150" to and including 8.510".

IF YOU BUY GAGES, Dearborn's 48-page illustrated catalog is designed to save you time. It's available to Inspection, Production, and Purchasing executives... send for it today!

DEARBORN GAGE COMPANY

"Measuring in Millionths for Three Generations"

22038 Beech Street • Dearborn, Michigan



REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES AND CANADA

chine rested on the bed along its entire length, for increased stability.

The knee, no longer fixed to the column by its lateral face alone, slides horizontally in the bed, which supports it along its entire length, whatever its position during cross-motion. The upright carrying the spindle slides in long vertical guides fitted to the knee.

This upright head also serves as spindle gear-box and supports the braked driving motor. Its dimensions are especially computed to combine maximum rigidity with a uniform and sym-

metrical distribution of the internal strains arising under cutting stress.

Operation is easy, owing to the reduction of vertically moving masses, and to the grouping of all controls at the front of the machine.

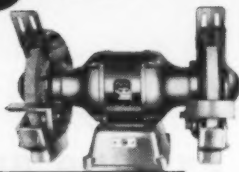
Overall rigidity, stability of table, ruggedness of spindle and feed mechanisms make possible extremely heavy-duty milling jobs, as well as fine finishing of very large surfaces.

The "Series Z" machines can accommodate vertical and universal heads, universal dividers and circular tables. Model "Z-3" is claimed to be the first

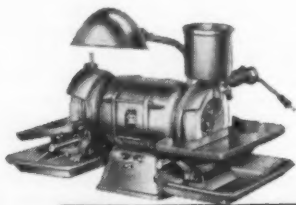
LESS VIBRATION ... GREATER ACCURACY!

Baldor

GRINDERS



183-10" Grinder. Every part oversize and ruggedly constructed for hard, continuous use. 1 HP, 1725 RPM. Wheels: 10" x 1" x $\frac{7}{8}$ " — 36 and 60 grit. Ideal for grinding large, odd-shaped pieces. **\$148.00.**



Carbide Tool Grinder. Sharpens quickly, accurately. Reversible $\frac{1}{2}$ HP motor withstands repeated overloads. 1 $\frac{1}{2}$ " wide wheels. **\$169.70**

Dynamically balanced Baldor Grinders provide smoother operation, far greater accuracy. Assure hours of relaxed, fatigue-free operation. Rugged ... durable ... the first choice of old hands who have tried 'em all.

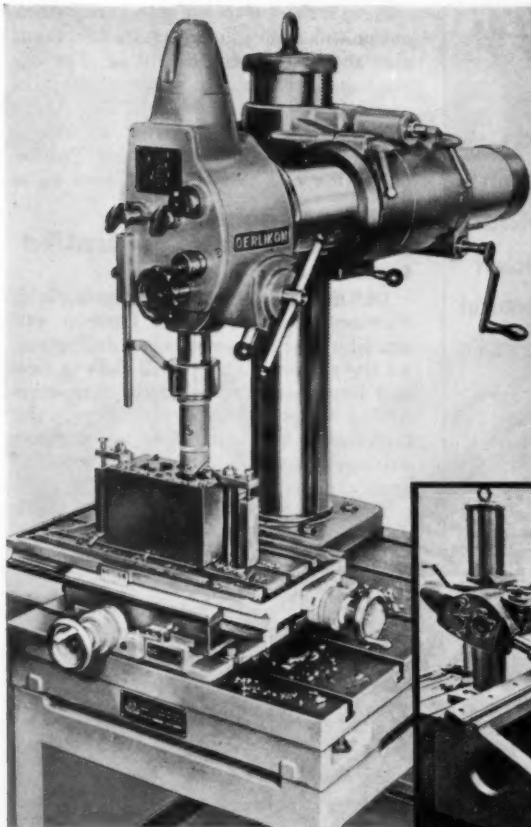
- Lubricated for life ball-bearing motors never need servicing!
- Splash-proof, totally enclosed motors protect against dust, dirt, grit. Can't cause trouble.
- Models for every need! $\frac{1}{4}$ to 3 HP, 6" to 12" individually balanced wheels. Bench and pedestal types.
- Every model fully guaranteed.

Write for Bulletin 321-M

BALDOR ELECTRIC CO.

4353 Duncan Ave.

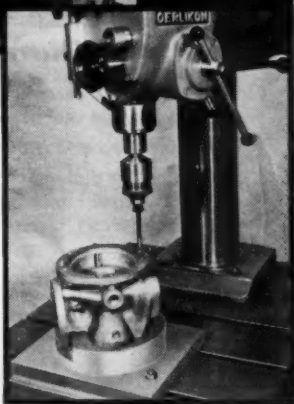
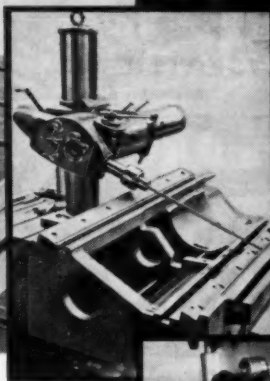
St. Louis 10, Mo.



UB 2 ALL ANGLE PRECISION BORER

The UB 2 performs hundreds of general and specialized workshop operations—drilling, milling, countersinking, tapping, precision and center boring, reaming, facing, trepanning, etc.

center boring,
reaming, fac-
ing, trepan-
ning, etc.



- Radial swivelling arm combined with a freely swivelling head, allows handling of any job—even in awkward positions.
- Boring head can be canted to any angle (360°) and latched accurately in the vertical and horizontal positions.
- Spindle speeds variable from 30 to 3070 rpm.
- Accessories include precision chuck, tapping heads, collets holder, adjustable boring head, facing and turning head, trepanning tool, boring bars, etc.
- Portable—take it right to the job.

Write for detailed information and prices to:
Mr. Francois Perret

c/o OLKON RESEARCH CORPORATION
630 Fifth Ave., New York 20, N. Y. • Tel.: Circle 6-0453
(Some exclusive territories still available)

"DAVIS" KEYSEATERS



are
moderately
priced
Efficient
Economical
Durable

Built in 3 sizes for cutting keyways
1/16" to 1" width. Circular
upon request.

DAVIS KEYSEATER CO.

407 1/2 Exchange St.

Rochester 8, N. Y.

Circle No. 379 on Card, Opposite Page 65

milling machine to execute rectangular automatic cycles; a special attachment also suits it for climb-milling. For the milling of aluminum and other light metals and plastics, Model "Z-1-ALU" is available. Manufacturer is Société Saviem, 41 Avenue Hoche, Paris, France. Use ACTION Card, opposite page 64. Circle No. 89

J & L demonstrates integrated tape-controlled machines

During October, at the Springfield, Vermont, plant, Jones & Lamson will unveil a new tape-controlled drill press. At the same time they will show a new and improved version of the tape-controlled turret lathe and demonstrate the integration possibilities in a shop equipped with more than one kind of programmed machine.

The demonstration will produce stock parts of differing specifications, but with only punched tapes being changed.

the new LOW PRICED OMEGA JIG BORER with the Giant Sized Table 20" X 32" WORKING AREA

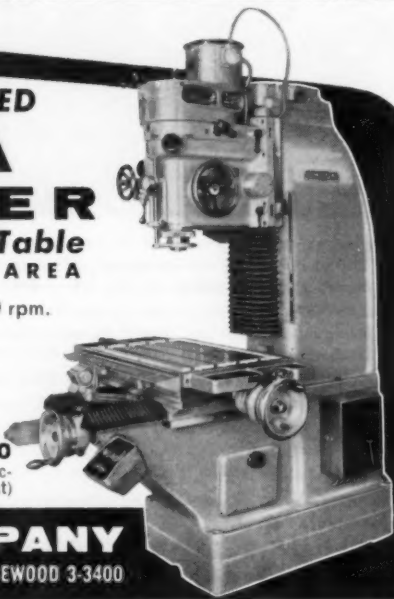
- 16 Spindle speeds from 35-1500 rpm.
- Hardened and ground screws
- Trays for dial indicators and measuring rods, motor and controls, included.

PRICE fob, New York **\$8300.00**

Optical measuring system with overall accuracy of .0002" (available at additional cost)

AMITool COMPANY

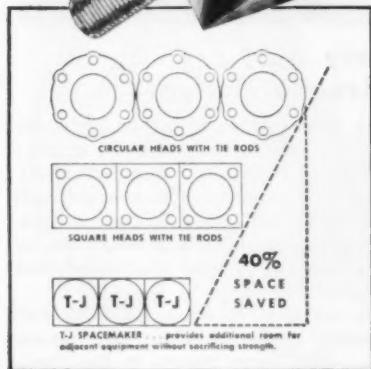
629 MAIN STREET, WESTBURY, L.I., N.Y., EDGEWOOD 3-3400



Circle No. 380 on Card, Opposite Page 65

Saves 40% Space! **STRONGER, TOO**

Than Outmoded
Tie Rod Cylinders!



**NEW LITERATURE . . . send today
for new Bulletin with complete
details of Spacemaker line.**

Only **T-J** **Spacemaker CYLINDERS**

Offer All The Extras As Standard!

- **NEW exclusive Ingenious Cushion Designs . . . Super Cushion Flexible Seals for Air . . . New Self-Aligning Master Oil Cushion**
- **Compact design eliminates tie rods, saves up to 40% space**
- **Proven Performance . . . with Extra High Safety Factor**
- **Hard Chrome Plated Bodies and Piston Rods (Standard, at no extra cost).**
- **OIL pressure to 750—AIR to 200 P.S.I.**

You'll find many answers to *automation* in your plant with T-J Spacemaker Cylinders! Designed with years-ahead features for top performance and dependability. Wide range of styles, capacities . . . for all kinds of push-pull-lift operations . . . reduces man-hours and costs! Write The Tomkins-Johnson Co., Jackson, Mich.

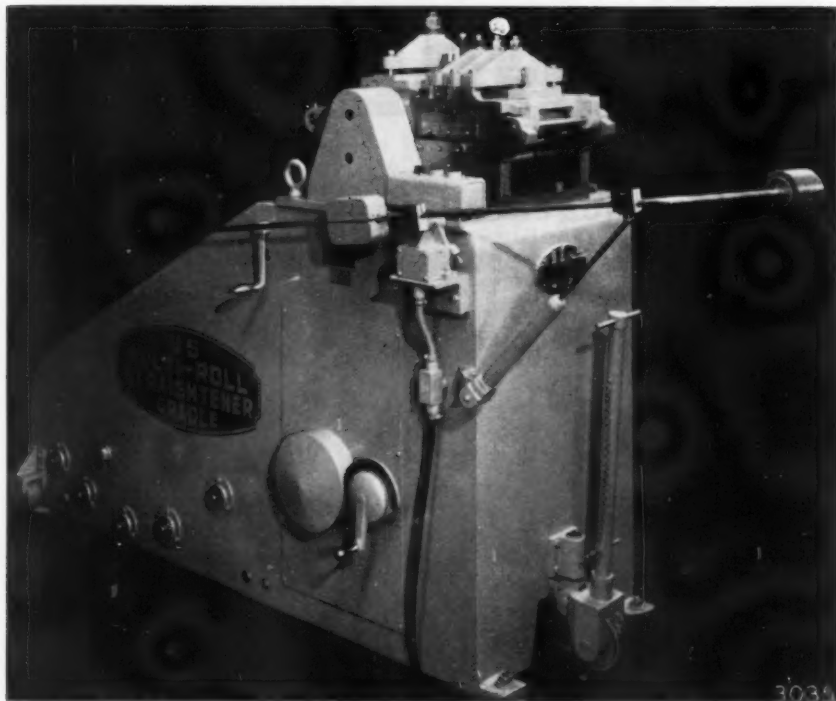
MEMBER OF THE NATIONAL FLUID POWER ASSOCIATION



TOMKINS-JOHNSON

PNEUMATIC, OIL AND HYDRAULIC CYLINDERS, CUTTERS, CLIMBERS

Coil Cradle and Straightener



U. S. Tool Co., Inc., Dept. RS, Ampere, N.J., has just brought out a combination coil cradle and power driven straightener Model PDSC-940.

Capacity: Width of material up to 9"; thickness, .025 to $\frac{1}{8}$ "; coils with o.d. up to 40" and weight up to 1500 lb.

Entire unit is on casters for portability. Cradle with five coil rest rolls mounted in self-aligning bearings. Inner side frames crank adjustable to accommodate stock width. Straightener is equipped with six hardened and ground straightening rolls mounted in needle bearings (lower 3 power driven), plus a pair of hardened and ground power driven take-in rolls. All upper straightening rolls are individually adjustable.

Use ACTION Card, opposite page 64. Circle No. 90

Heavy duty hydraulic slotter

The Rockford Model SM hydraulic slotter is built in 36" and 48" stroke-length sizes. It is rigidly and powerfully constructed to provide ample strength to utilize the full power of the machine. All cross, longitudinal and rotary movements are full pendant-actuated and controlled.

The machine is equipped with full hydraulic drive, having two speed ranges, with servo control to the pump so that cutting speed may be infinitely varied from zero to maximum in either range.

No levers are required for engagement of any feed or traverse movement. Two-speed traverse is available,



PRODUCTION VERSATILITY

ON A GREENLEE 6-SPINDLE AUTOMATIC BAR MACHINE

Greenlee Automatics provide accurate and fast production of an almost endless range of parts. Standardized tooling, wide open tooling area, interchangeable cross-slide cams, built-in threading drive, rapid stroke-setting and other Greenlee advantages provide great versatility, assure a quick and generous return on your equipment investment.

PHONE
ROCKFORD 3-4881
TO HELP SOLVE YOUR
PRODUCTION PROBLEMS



**GREENLEE
BROS. & CO.**
1840 MASON AVE.
ROCKFORD,
ILLINOIS

Circle No. 382 on Card, Opposite Page 65

**HIGHER SPEEDS!
FASTER GRINDING!**

kipp

AIR GRINDERS

MODEL JA
50,000 R.P.M.

\$42⁰⁰
IN U.S.A.



Weight 12 ounces;
length 6¾ inches;
chuck size ½ inch.
Wheel guard removed
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

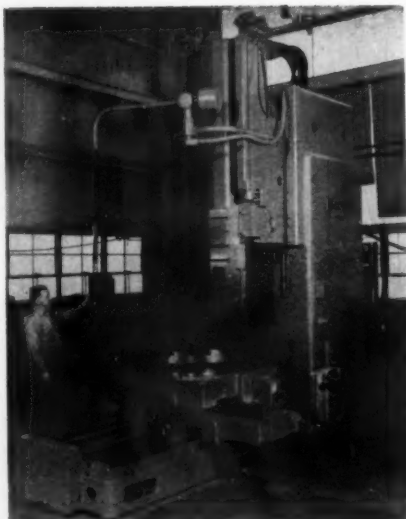
High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

kipp

MADISON-KIPP CORP.

207 Waubesa St., Madison 10, Wis., U.S.A.

Circle No. 383 on Card, Opposite Page 65



enabling the operator to position the work to a few thousandths without manual movements, although manual control of all movements is available from either side of the machine.

Built-in dividing head is arranged for power operation. A pre-determining counter automatically stops the table, for any selected number of turns, within one-tenth of a revolution. This eliminates manual labor for approximate rotary positioning, requiring the operator to manually index only for very precise rotary location. The position of upper and lower reverse dogs on the ram may be changed from the push button station. This enables the operator to lengthen or to shorten the stroke without using levers or cranks. The ram may also be locked from a button on the pendant, thus providing control of all movements directly from the pendant. Rockford Machine Tool Co., Dept. E, 2500 Kishwaukee St., Rockford, Ill.
Use ACTION Card, opposite page 64. Circle No. 91

OBI press has deep throat

The 15-ton, Rousselle Model 2F OBI press provides 12 inches of throat room,

When a
product design
can be simplified

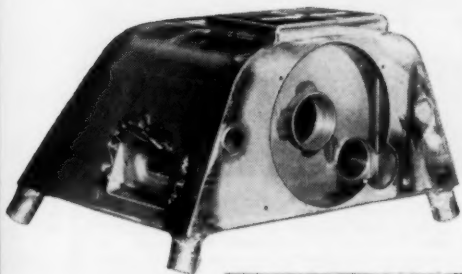
Has greater
strength . . .
higher rigidity

Yet takes less
material . . . costs
less to produce

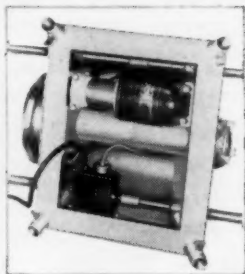
WHY
use anything
but
welded steel

STEEL DESIGN CUTS WEIGHT AND COST

...without sacrificing
strength and rigidity



All-welded headstock
for power drive is made
from 16 gauge sheet. Es-
timated to be 20% more
rigid, weigh 28% less,
cost 44% less than cast
iron design. Photos cour-
tesy Oster Manufacturing
Company, Cleveland, O.



You can duplicate these benefits . . . now by simply
changing your designs to welded steel construction.
The change over can be made easily using Lincoln's
Weldesign System. Your production will be simpli-
fied, your product more durable and appealing. A
Lincoln representative will gladly show you how to
start. Write us.

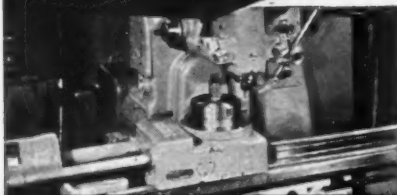
THE LINCOLN ELECTRIC COMPANY

Dept. 3611 • Cleveland 17, Ohio

*Creating Lower Cost for Industry . . .
With Welded Steel*

Circle No. 384 on Card, Opposite Page 65

How To Increase Production And Improve Accuracy



With a **SUNDSTRAND** Automatic Index Base

In many cases, the addition of this Automatic Index Base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this service.

**Accurate
Spacing,
Powerful
Clamping
Insures
Accuracy**



Sundstrand
Automatic Index Base

This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

Get Complete Data Free

This 8 page booklet contains production figures and specifications. Send for your copy today. Ask for bulletin 473.



SUNDSTRAND MACHINE TOOL CO.
2535 Eleventh Street, Rockford, Ill., U.S.A.

Circle No. 385 on Card, Opposite Page 65



measured from ram center to frame. To assure accuracy and uniformity of presswork in a machine of this type, the frame had to be heavily reinforced and very ruggedly built. On it are mounted a roller bearing flywheel, oversize clutch mechanism, heavy-duty crankshaft, generous bearings, set closely so as to all but eliminate shaft deflection, and a stout ram supported by long, adjustable V-type guides to maintain true alignment. Service Machine Co., Dept. HS, 2310 W. 78th St., Chicago 20, Ill.

Use ACTION Card, opposite page 64, Circle No. 92

Pin-type arbor

Precision machining of gears with involute splined bores is facilitated by a pin-type arbor developed by Scully-Jones and Co., Dept. HS, 1901 S. Rockwell St., Chicago 8, Ill.

Arbor is claimed to speed produc-

A few precision pieces produced on Gorton 2- and 3-dimensional Pantographs which saved time and money.



240 Pieces per hr.:
serpentine groove
cut in 1213 steel
.1903" + .0014"
X .109" + .003".
Finish 35 mcr.

GORTON

Multiple Pantographing

VOLUME PRODUCTION — PRECISION TOLERANCES

Tool Room Accuracy and High Production are Gorton Characteristics! From a dozen to a million pieces at exceptional repetitive accuracy. From two to six different operations performed at one setting. Automatic Cycling during engraving, milling, profiling, chamfering, counter-boring, grooving, routing, slotting, graduating, grinding, etching. Production is dependent only on cutter capacity. Spindle speeds from 900 to 45,000 R.P.M. Conventional or climb milling. Manual control for short runs. Automatic cycling for production runs.

3 Services Available

1. 16 Standard Models
2. Expertly-Designed Special Tooling
3. Custom-Built Special Machines

Newest Gorton 2-dimensional Pantograph, PI-2 Heavy-Duty model.



Write for
Bulletins
1655,
2595-DS,
2604-DS
1410

General Catalog



GEORGE GORTON MACHINE CO.

1410 RACINE STREET

RACINE, WIS.

SINCE 1893

Tracer-Controlled Pantographs, Duplicators—standard and special... Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

A 8846-1PA

Cut Costs!
with the *Veet*
**3 Ft. PRECISION
RADIAL DRILL**

with
**FLAME HARDENED
COLUMN**



GUARANTEED
for 1 year against
defective parts or any
mechanical defects.

\$2950⁰⁰

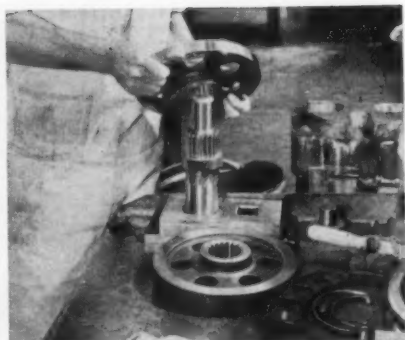
F.O.B.
DETROIT

**PRICED AS LOW AS
AN UPRIGHT DRILL!**

Send for our new brochure describing the 16 points of superiority of the VEET Precision Radial Drill.

MANUFACTURED BY
Veet INDUSTRIES
TELEPHONE PReston 5-3000
25753 GROESBECK HIGHWAY EAST DETROIT, MICH.

Circle No. 387 on Card, Opposite Page 65



tion by a rapid method of loading, locking, and unloading pieceparts. No arbor press is required to press the gear on and off the arbor, and no nuts or wrenches are required for locking piecepart on arbor.

Improved quality of the finished gears is possible because the arbor eliminates pitch line runout in subsequent gear cutting operations. Also, the face and sides of the gear blank will run square and true due to the powerful hold generated by the arbor pins.

Use ACTION Card, opposite page 64. Circle No. 93

Bench model lead comparator

The Jerpbak-Bayless standard bench model SK-1003 lead comparator has a thread diameter range of from .112" to



MACHINE and TOOL BLUE BOOK

BARNESDRIL

Magnetic COOLANT SEPARATORS



give you these features for

Practical COOLANT CLEANING!

Automatic — the Separator requires no attention other than periodic emptying of the sludge pan.

Intense Magnetic Power — coolant flow is restricted to intense magnetic field so that more ferrous material, entrained abrasives and other foreign matter is removed per minute per gallon than by any other method.

Double Cleaning Action — magnetized particles form a fan-shaped pattern on the surface of the magnetic drum which serves to "comb out" free abrasive or other materials as the drum rotates.

Rapid Separation — coolant is processed rapidly, flowing by gravity through the separator, for effective circulation at all times. No additional coolant supply necessary to compensate for the cleaning operation.

Barnesdril Automatic Coolant Separators remove swarf, sludge and abrasive particles automatically from soluble and oil coolants. Built in ten sizes — 1½, 3, 5, 10, 20, 30, 70, 100, 280 and 350 gallons per minute, capacity.

Write for
Catalog 300E



FILTRATION DIVISION BARNES DRILL CO.

852 CHESTNUT STREET • ROCKFORD, ILLINOIS

Circle No. 388 on Card, Opposite Page 63

2.0". Length capacities, between points, are from one-quarter inch to six inches.

The open-face dial is recessed into a housing that is mounted to a V-block. The leads of threaded parts are measured by inserting the parts into the V with the portion to be measured held between the two adjustable contact points. Jerpbak-Bayless Co., Dept. RH, Solon, O.

Use ACTION Card, opposite page 64. Circle No. 94

Welding positioners

Worthington Corp., of Plainfield, N.J., has redesigned its entire line of pedestal type welding positioners to incorporate Duff-Norton worm gear jacks for elevation of the frames.

The result is more accurate elevation at reduced production costs. One jack, powered by an electric motor (insert), can lift as much as 50 tons 8 inches in

for automatic feeding of Small Parts ***SYNTRON*** **PARTS FEEDERS**



**of proven
dependable Quality
more production, lower job costs**

Syntron Vibratory Parts Feeders provide an automatic feed method that will select and feed parts of practically any size, shape or material—single file in oriented position through a gravity fed track to usage points at controllable rates to meet capacities of operations. Electromagnetic vibrations can increase your production automatically.

Write for Catalogue data - FREE

**Write for FREE
Catalogue Data**

SYNTRON COMPANY

300 Lexington Ave.

Homer City, Pa.

STILL THE LEADER IN ITS CLASS!



Model O 5-Ton

5 TON PRESS-RITE POWER PRESSES

Compare
Feature
for
Feature

... the features you'd
expect to find only in
the larger presses!

THEN COMPARE PRICE

\$267.00

(FOB St. Paul, Minnesota
less motor & Belt guard)

- **Special High-Strength Frame** with reinforcing ribs at all vital points.
 - Reduces die-wearing deflection.
 - Increases Production between die grinds.
 - Gives 2 to 3 times longer die life.
- **Special Bronze-Bushed Flywheel.**
- **Bronze Bearings** in both the main bearings and connecting rod.
- **Bronze Wear Plate** on back of ram-ways.
- **Greatest Shut Height** for their size!

10 MODELS: 2-Ton, 5-Ton, 10-Ton, 15-Ton, 20-Ton, 30-Ton, 37-Ton, 45-Ton, 60-Ton, 85-Ton.

Permits using larger, more bulky dies.

- **Adjustable Ram Gibs** for more precise alignment.
- **Open Back, Inclined.**
- **Single Stroke Safety** (may be quickly arranged for continuous operation).
- **Steel Bolster Plate.**

Yes, Press-Rite Power Presses are built-for-the-job. Save money in your plant. Switch to PRESS-RITE . . . Top buy in the field!

Write Today for Bulletin 955

PRESS-RITE DIVISION

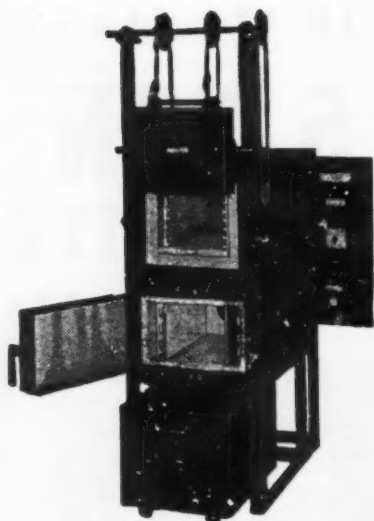
SALES SERVICE MACHINE TOOL CO., 2357 University Ave., St. Paul 14, Minn.

used by more . . . for more production

PRESS-RITE-

OPEN BACK • INCLINABLE *Power Presses*

Circle No. 390 on Card, Opposite Page 65



SAVE SPACE WITH A LUCIFER 8055 COMBINATION MODEL

Two independent furnaces (hardening and drawing) in the same floor space one requires. Complete with independent controls. Hardening furnace available in both a 2000° and a 2300° F. range.

Drawing furnace has a maximum of 800° F.* Quench tank included with the exception of the largest standard model.

Chamber Size			Prices	
H.	W.	L.	2000° F.	2300° F.
6"	6"	12"	\$ 750.00	\$ 850.00
9"	9"	18"	1150.00	1250.00
12"	12"	24"	1600.00	1700.00
18"	18"	36"	2400.00	2500.00

*Also available in 1250° F.

WRITE FOR FREE LITERATURE, SPECIFICATIONS and price list of Lucifer Furnaces in wide range of sizes —top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

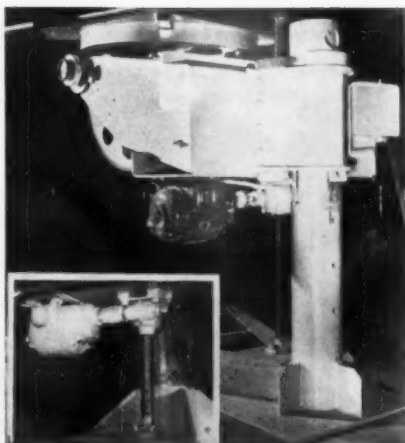
LUCIFER

FURNACES, INC.

NESHAMINY 1, PA.

Phone Osborne 5-0411

Circle No. 391 on Card, Opposite Page 65
246



60 seconds at the touch of a push button. The self-locking worm gear jack eliminates possibility of slipping or creeping under load.

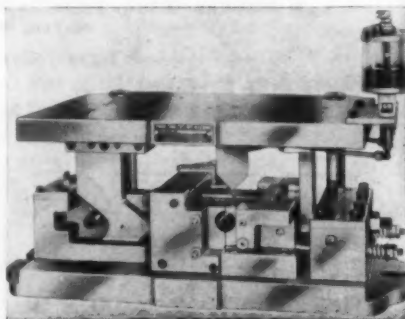
Jacks range in capacity from five to 50 tons. Raise varies 8 to 30 inches.

Use ACTION Card, opposite page 64. Circle No. 95

Tube cut-off machine

In a single downstroke of the punch press, this tool will shear off pipe or tubing in lengths of $\frac{1}{2}$ " or more to within $\pm .010$ ". The edges of both sheared pieces will be clean, showing little roughness or burr.

Costs run about $\frac{1}{2}$ c per cut. Depending on length and wall thickness, approximately 1000 to 2000 pieces of pipe or



MACHINE and TOOL BLUE LOOK

"Liquid Honing" pays for itself 5 times faster than it depreciates!"

*says Clarence H. Stowe,
president of a Milwaukee
tool and die shop*



**Dollar for dollar,
job for job, no other surface
conditioning method can
equal Liquid Honing.**

"Our Liquid Honing machine," Mr. Stowe continues, "enables us to remove heat-treat scale instead of waiting for the heat treater to do it. Consequently, customers get faster job deliveries."

"In only one-fourth usual time, Liquid Honing cleans molds for repairs or remodeling — and ends what used to be a difficult, tedious hand operation."

"Many die casting and plastic molds now go out with an oil-retaining Liquid Honed satin finish that eliminates hand polishing after final heat treating."

"In addition, we clean hand tools, spare machine parts, cutting tools, electrical contacts — anything small enough to go into our machine. So it's easy to understand why Liquid Honing will pay for itself within a year — *five times faster than it depreciates!*"

That's the Stowe story—a "preview" of a few of many advantages Liquid Honing can bring to your tool room, machine shop or die department. You'll be surprised at the low cost — only \$550 to \$1500 for a standard machine.

**Write for details or send a sample part
for free demonstration processing.**

*Vapor Blast and
Liquid Honing
are trademarks.

**VAPOR BLAST MFG. CO. 3123 W. Atkinson Ave.
Milwaukee 16, Wisconsin**

Circle No. 392 on Card, Opposite Page 65





Micro Spray

LAY-OUT DYE

(Purple)

MICCRO Lay-Out Dye, long the leader in its field, now available in an AEROSOL package for SPRAYING.

All the advantages—instant drying; clear, sharp lines—*plus* easy-to-use, dependable, efficient MICCRO Spray container.

Regular MICCRO Supreme Lay-Out and Identification Dye in seven distinctive colors available as always in brush-in-cap and conventional containers.

*Write for circular
on company letterhead*

**MICHIGAN CHROME
& CHEMICAL COMPANY**

8615 Grinnell Ave., Detroit 13, Mich.

Circle No. 393 on Card, Opposite Page 65

tubing can be handled per hour without crowding tool. Blade can make 10,000 to 15,000 cuts, the die 25,000 to 35,000 cuts before they have to be resharpened. All blades and blocks are interchangeable and are obtainable in any size or diameter within the range of the tool.

Unit comes in three standard sizes to accommodate tubing up to and including $\frac{1}{2}$ " o.d. x $\frac{3}{32}$ " wall, up to and including 2" o.d. x $\frac{1}{8}$ " wall and up to and including 3" o.d. x $\frac{3}{16}$ " wall. Vogel Tool & Die Corp., Dept. RB, 1825 N. 32nd Ave., Melrose Pk., Ill.

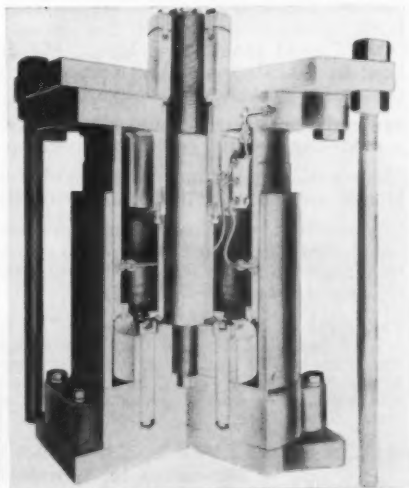
Use ACTION Card, opposite page 64, Circle No. 96

Pneumatic die cushion

Model DR all-steel weldment pneumatic die cushion, in sizes from 8 to 16", has a ring holding pressure from 5 to 20 tons. It is provided with a new high pressure positive lubricating system with an internal guiding means to compensate for the off-center loading of the furnished hardened and ground pin pressure pad.

This heavy die cushion is of universal application, and can be applied to practically any power press. The Dayton Rogers Mfg. Co., Dept. RB, 2824 13th Ave. South, Minneapolis 7, Minn.

Use ACTION Card, opposite page 64, Circle No. 97



MACHINE and TOOL BLUE BOOK



**PAYS FOR
ITSELF
IN A HURRY**

**—AND IT'S
BUILT TO LAST!**

**CUTS
PUNCHES
NOTCHES
SHEARS
SLITS
COPEs
MITERS**
without changing tools!

"BUFFALO" UNIVERSAL IRON WORKER

Yes, here's one machine to do all these metalworking operations in your shop—as many as 3 at one time! Built to take years and years of punishment, too, with its rugged electrically welded steel plate frame and 1-shot lubrication system. Thousands of users have found it the most useful machine in their shops. Write today for Bulletin 360—see the angles, tees, channels, bars and flats it will handle for you—fast!



BUFFALO FORGE COMPANY

161 Mortimer St.

Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING

PUNCHING

SHEARING

BENDING

October, 1956

Circle No. 394 on Card, Opposite Page 65

249

IMMEDIATELY AVAILABLE!

HIGH SPEED 1-TON

DENISON HYDRAULIC *MULTIPRESS*®

Industry's most versatile production tool
...gives up to 750 strokes
per minute!



SAVE ON TOOLING COSTS FOR

- marking plastics, novelties, and leather
- assembling electronic parts
- trimming die castings
- plus assembling, marking, broaching, swaging, compacting

Cost ONLY **\$395⁰⁰**
F. O. B.
Factory

Delivery subject to prior sale



Write
DENISON ENGINEERING DIVISION
American Brake Shoe Co.
Dept. 1245, Columbus 16, Ohio

Circle No. 395 on Card, Opposite Page 65

15,000 THREADED NAILS per hour with HARTFORD Thread Rollers... *Automatically*

USER REPORT:

From Chas. F. Baker
& Co., Framingham,
Mass., John P. Hillberg,
General Manager:
"Hartford Special
machines have been
more than satisfactory
on production and
especially economical
on up-keep."

QUICK SPECS

Nail Diam. Capacity—.080" to .169"
Thread Length Capacity— $\frac{1}{8}$ " to 2"
Production Rate—250 pcs. per min.
Floor Space Required 4' x 5'
Machine Size—42" x 26" x 52"

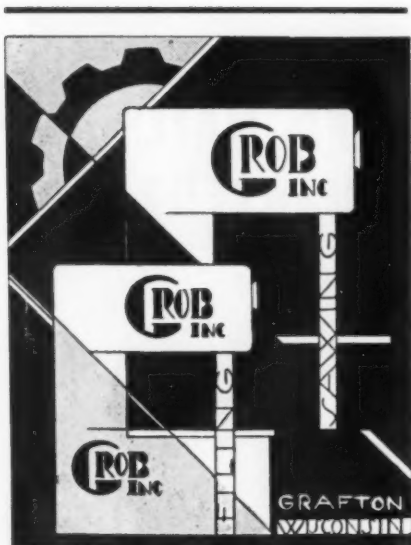
For detailed information write for
Bulletin TR-102.

Machine Tool Accessories Division
THE HARTFORD SPECIAL MACHINERY CO.
26410 Homestead Ave., Hartford, Conn.



Nail down the answer to your
nail and screw threading
problem. Check the specs.

HARTFORD
Special



ROB INC.,

GRAFTON, WISC.

Circle No. 397 on Card, Opposite Page 65



DON'T LET THIS HAPPEN

End Oily Floors with

DRY-IT

Reduce Accidents and Costly Time-Offs
No Fire Hazard!

Write For Free Sample!

TAMMS INDUSTRIES, INC.
228 N. LaSalle St. Chicago 1, Ill.

Circle No. 398 on Card, Opposite Page 65

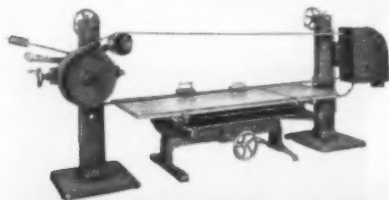
These two OLIVER Grinders can cut costs on many jobs!

OLIVER NO. 190-W WET GRINDER AND POLISHER

Ideal for finishing outside and inside edges of nonferrous metal castings and plastics. Whirling jet of water is sprayed on belt. This sturdy, low-cost machine quickly pays for itself.

NO. 183-M BELT SURFACER AND POLISHER

For finishing surfaces of plates, metal mouldings, etc. The three units are adjustable to take work of any practical size. Turned aluminum pulleys have 7-inch face. Ball bearings, direct motor drive. Oliver makes other belt grinders and several disk and spindle grinders.



Write for details.



Get this folder on newest Metal Working Machines.



OLIVER MACHINERY COMPANY
Established 1890 GRAND RAPIDS 2, MICHIGAN

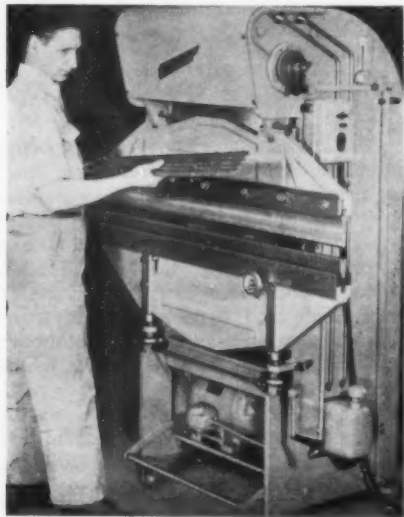
Circle No. 399 on Card, Opposite Page 65

Larger model added to press brake line

The 12-ton hydraulically operated Di-Acro press brake with 48 inch length of bed and ram, Model 18-48, features "stroke control." The most practical length of stroke for each job can be preset, with the shortest length of stroke usually giving greatest production efficiency and safety for the operator.

Ram of press brake is mechanically linked to a cam shaft which is turned by power being applied to a rotary hydraulic cylinder. The oscillating action of this cylinder has a maximum movement of 270°. Any length of stroke can be secured with adjustment of a special stroke control selector, without having to readjust the bed or die settings.

The ram always works off the bottom of the stroke, hence full pressure is always developed regardless of the length of stroke. Rate of 60 strokes per minute is obtained on a quarter inch opening, while at the full opening of 1½ inch, the rate is 25 strokes per min-



ACTUAL SIZE



Attach this page to
your letterhead and
forward for our new
16 page catalog

CONICAL TOOL CO.

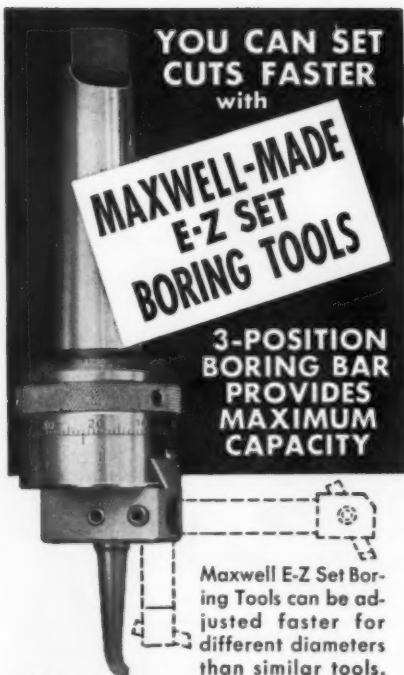
3801 Buchanan S.W.
Grand Rapids 5, Michigan

Circle No. 400 on Card, Opposite Page 65

**YOU CAN SET
CUTS FASTER**
with

**MAXWELL-MADE
E-Z SET
BORING TOOLS**

**3-POSITION
BORING BAR
PROVIDES
MAXIMUM
CAPACITY**



Maxwell E-Z Set Boring Tools can be adjusted faster for different diameters than similar tools.

This is accomplished by simply rotating the precision calibrated micrometer-like dial which causes tool block to feed radially out or in, and provides boring accuracy to within .0002-inch.

Maximum safety of operation and ease of handling is assured by smooth circular shape. Interchangeable shanks facilitate use of E-Z Set Boring Tools in turret lathe, jig bore, milling machine, boring mill, automatic or other machine tools. Three types are available having maximum boring bar capacities of $\frac{1}{2}$ ", 1" and $1\frac{1}{2}$ ", and covering a boring range from $\frac{3}{8}$ " to 20".

**WRITE TODAY FOR E-Z SET
BORING TOOL CATALOG**

395R-MC



**THE MAXWELL
COMPANY**

MACEDONIA, OHIO

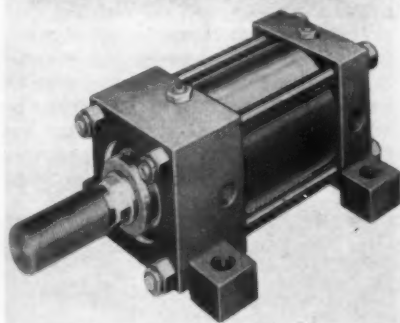
Circle No. 401 on Card, Opposite Page 65

ute. Regardless of the number of strokes per minute, the ram and die always enter the material at constant speed, eliminating most of the dangerous whipping of the material. Ram is also sensitive to inching and can be backed off at any point in the operating cycle by touching a reverse lever and using the foot control. O'Neil-Irwin Mfg. Co., 562 Eighth Ave., Lake City, Minn.

Use ACTION Card, opposite page 64. Circle No. 99

Hydraulic cylinders have 2000 lb. pressure

Logan Super-Matic hydraulic cylinders incorporate the following features: pressures to 2000 psi; seven bore sizes, from $1\frac{1}{2}$ " to 6"; maximum stroke, 72"; five mounting styles—foot, trunnion, centerline, flange, pivot and manifold



with interchanging covers to permit multiple mounting combinations; front and blind-end covers of heavy steel plate; piston rods of highly polished steel to assure minimum friction and maximum packing life—available in either standard or heavy-duty size in both male and female; cylinder tubes hard-drawn and corrosion-resistant for low friction; unobstructed ports which can be relocated to any 90-degree position by rotating cylinder covers; extra-heavy tie rods to maintain tension and resist shock loads. Logansport Machine Co., Inc., Dept. HS, Logansport, Ind.

Use ACTION Card, opposite page 64. Circle No. 98

ANGLE TOOLS?

BUCKEYE builds all types!

DRILLS

NUTRUNNERS



NEW

90° angle head nutrunners, reversible. Standard head illustrated; also available with short coupled head.

SCREWDRIVERS

There's a Buckeye angle tool for every drilling and fastening job—including yours. No matter how special your requirements, you're sure to find a Buckeye angle tool exactly suited to your work. Choose from almost 500 types, models and speeds—all described in our Catalog A-10.

Buckeye Tools
CORPORATION

DIVISION 14 • DAYTON 1, OHIO

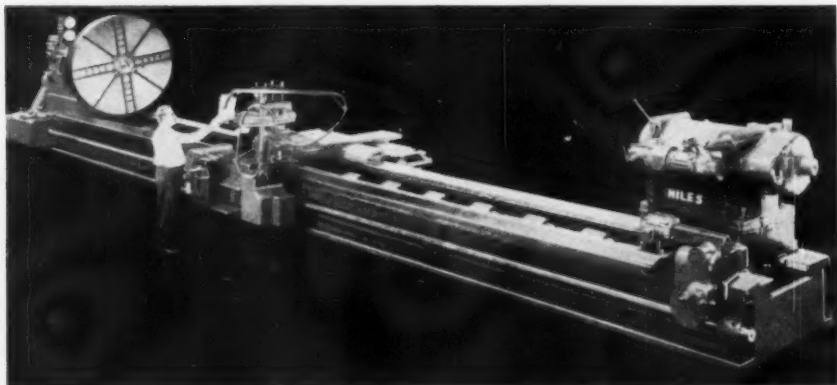
producers of
the world's first
successful
rotary air tools

Heavy Duty Engine Lathe

The Model 72-A engine lathe is a heavy-duty machine which incorporates these features: (1) speed and load indicators on the faceplate drive, (2) load indicator on the adjustable, spring-loaded tailstock quill, (3) fully en-

closed leadscrew speed and thread selector dial, (4) hydraulic booster on the faceplate speed changer, (5) lubrication oil-pressure protection, and (6) optional electronic feed control.

The speed and load indicators on the



WHY WASTE YOUR PROFITS ON MAKESHIFT SETUPS?



BE WISE
Save with
NORTHWESTERN



T-NUT & STUD SETS—12 SIZES

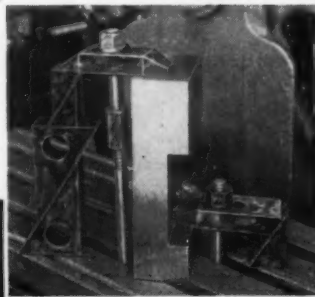
PUNCH PRESS SETS—5 SIZES

STEP BLOCK & CLAMP SETS—5 SIZES

CATALOG No. 23 SENT ON REQUEST

Northwestern

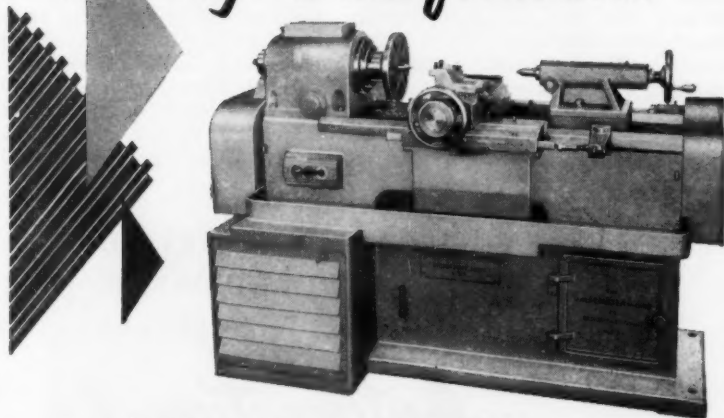
118 HOLLIER AVE., DAYTON 3, OHIO



Circle No. 403 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

Threading Blindfolded...



It's really possible with the NEW COULTER Model "B" THREADING MACHINE

HERE IS YOUR INTRODUCTION TO THE NEW COULTER MODEL "B" HIGH SPEED, SINGLE POINT THREADING MACHINE . . . the machine with an automatic threading cycle!

Never before has a threading machine been so easy to operate! Just put the work in, push a button and the COULTER "B" goes through a pre-determined threading cycle; coming to a stop when the piece is threaded — set for the next piece, *automatically!* You never worry about the thread diameters, for the "In-and-Out" tool mechanism controls the diameters, *automatically.*

A Few Exclusive Features

- ... A worm and gear spindle drive!
- ... Work spindle operates in one direction of rotation!
- ... "Pick off" gears permit changing from one pitch to another quickly!
- ... Electrically controlled clutch assures starting and stopping on time!

Thread it Better, Faster . . . AUTOMATICALLY, with a COULTER.

For information on the New COULTER "B", write, wire, phone.

The **James Coultter Machine Co.** 637 Railroad Ave.
Machine Tool Builders Since 1896

Bridgeport 5, Conn.

headstock enable the operator to keep a close check on machine performance and assist him in loading it to capacity without danger of applying excessive overloads. The load indicator on the tailstock quill obviates guesswork when preloading the quill spring to suit the workpiece, thereby saving time in set-up and preventing damage to centers.

Main drive for the lathe is by a 100 horsepower, adjustable-speed, 400 to

1600 rpm, direct-current motor, but variable-voltage drive can be substituted. Headstock spindle and spindle driving gears are equipped with anti-friction bearings. Mounted on the headstock are jog buttons for forward and reverse to facilitate gear shifting.

The faceplate, with adjustable-speed direct current drive, has three mechanical speed ranges: through faceplate drive, 1.35 to 5.4 and 5.48 to 21.9 rpm;

MEYCO CARBIDE INSERTED DRILL JIG BUSHINGS PROVE THEMSELVES

IN Automation!

The reason is simple: these unique bushings are ideally suited for long-running, uninterrupted operations!

MEYCO carbide inserted bushings assure long life for drills, jigs, fixtures . . . accurate work maintained, resulting in less down-time, fewer lost man-hours. Last almost as long as solid carbide bushings, cost slightly more than ordinary bushings. Get the full story:

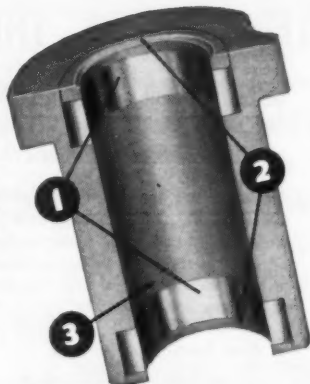
Write for information and price list, ask for Catalog No.

44

EST.
1898



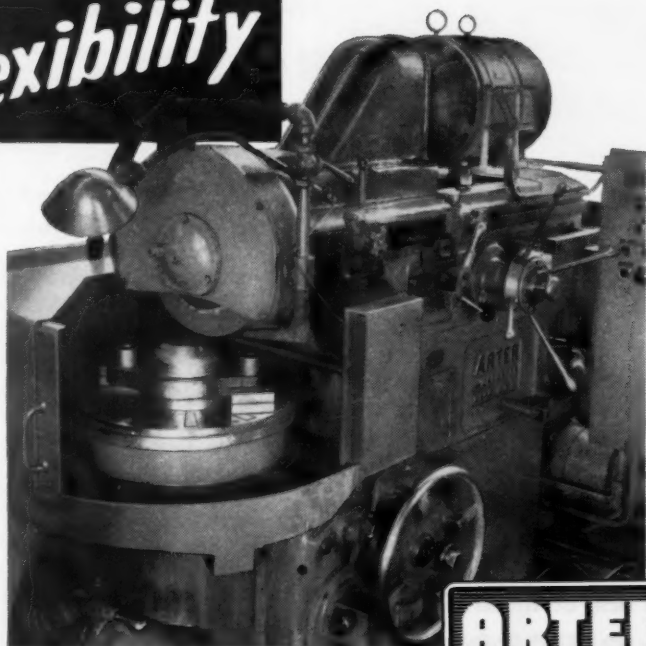
W. F. MEYERS CO., INC., BEDFORD, INDIANA



PATENTED

1. Tungsten carbide rings at the points of wear; 2. Steel rings protect drills and carbide; 3. Special hardened alloy steel body.

Flexibility



ARTER

Arter Model D Rotary Surface Grinders are extremely flexible in their application to a wide range of surface grinding problems. By using special chucks, many seemingly difficult surface grinding jobs are made easy, permitting great savings in set-up time.

Here is one of General Electric's Arter Model D 16" Rotary Surface Grinders being used to grind punches for motor laminations. The

chuck has a large diameter central hole to provide clearance for the shank.

The Arter Model D has great vertical capacity, hand and automatic feeds and a tiltable worktable. An arrangement for grinding work in a complete automatic push button cycle can be supplied.

For the best answer to your surface grinding problems—ask your Arter engineer.

ARTER GRINDING MACHINE COMPANY

WORCESTER 5, MASSACHUSETTS

Jigmatic Automatic Tape Controlled Positioning Table • Rotary Surface Grinders
Flat Circular Cutter Grinders • Internal Grinders • Cylindrical Grinders • Carbide Tool Grinders

AGENTS IN INDUSTRIAL CENTERS OF UNITED STATES AND CANADA

Circle No. 406 on Card, Opposite Page 63



For easy, economical
machine shop cutting
use one of these 8 sturdy
DISSTON

HACK SAW BLADES

They cut easily...resist
wear and breakage. Get
them through your

**INDUSTRIAL
DISTRIBUTOR**



WRITE FOR
LATEST CATALOG AND
HACK SAW SELECTOR
TODAY.

**Henry DISSTON DIVISION
H.K. PORTER COMPANY, INC.**
1049 Tacony, Philadelphia 35, Pa.



Circle No. 407 on Card, Opposite Page 65

through spindle drive 25.2 to 101 rpm.

Swing over bed and carriage wings is 73½ in. and over carriage bridge is 56 in. Faceplate diameter is 72 in. Distance between centers is nominally 46 ft., but can be made to suit customer specifications. Over-all length is 59 ft. Baldwin-Lima-Hamilton Corp., Dept. JS, Hamilton, O.

Use ACTION Card, opposite page 64. Circle No. 100

Hydraulic lift table

A small, battery powered hydraulic lift table for tool and die makers and plant maintenance departments has been introduced by the Colson Corp., Elyria, O. This 2000 lb. capacity portable lift table is adapted from a mechanical hand crank model with a hydraulic ram replacing the Acme thread screw.

The ram is powered by a battery hydraulic power unit. This is composed of a rotary gear pump with a 12 volt DC motor and two series connected 6 volt, 130 ampere hour, 19 plate batteries. It has a built-in eight ampere hour trickle charger with cut-out switch.

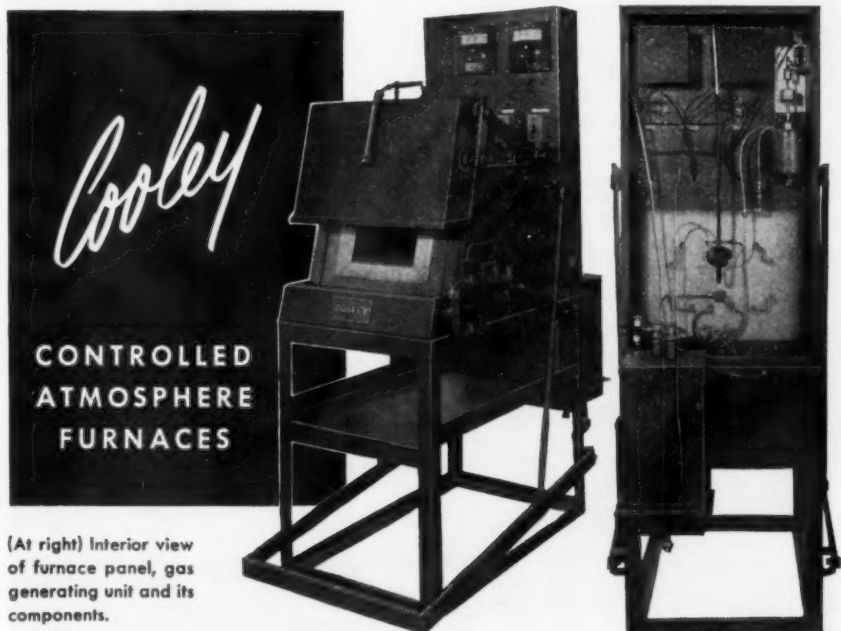
Deck of the table is 26" by 43". Height range is from 28" to 42" at a lifting speed of 11 feet per minute. The table is raised and lowered by a "dead-man" rocker type foot pedal. List price is \$890.

Use ACTION Card, opposite page 64. Circle No. 101



MACHINE and TOOL BLUE BOOK

Fully Automatic—Controlled Atmosphere



(At right) Interior view of furnace panel, gas generating unit and its components.

Tool Room Heat Treating Furnaces

Outstanding advantages—ability to consistently harden tool steels, clean and free from scale, with minimum attention from the operator—initial equipment low cost—moderate operating expense.

The atmosphere used in these furnaces is produced from alcohol and water which, when cracked at a constant temperature, produce gases of constant analysis. Research tables provide data for alcohol-water proportions and cracking temperatures for most commonly used steels. No further metallurgical information is needed. Two sizes—10" x 8" x 18" and 8" x 6" x 14"—for operation to 2000° F.

Catalog and complete information will be gladly furnished on request.

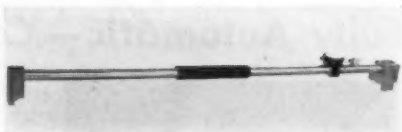
COOLEY ELECTRIC MANUFACTURING CORPORATION

36 S. SHELBY STREET • INDIANAPOLIS 7, INDIANA

Circle No. 408 on Card, Opposite Page 65

Large diameter bar gages

A series of large diameter bar gages, providing .0001" accuracy for inside or outside diameters as large as 36" has been announced by Rimat Gage Co., Dept. KE, 21 W. Dayton St., Pasadena, Calif. Solves problem of how to inspect highly accurate large diameters at specific gage points, on shoulders,



or in grooves.

Infinite variability between 9" and 36" can be obtained.

Use ACTION Card, opposite page 64. Circle No. 117

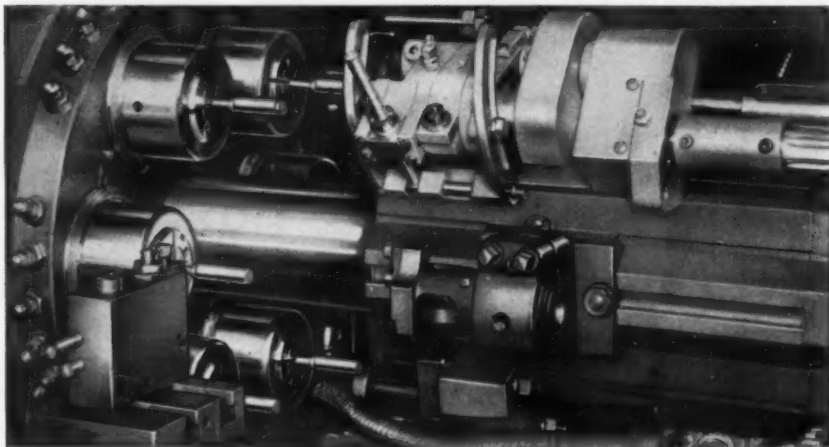
Attachment Eliminates Secondary Operations

The Turnmill is an attachment for multiple-spindled automatic screw machines, that permits you to mill any number of flats or slots while the part is turning in the spindle. It operates during the normal cycle of the screw machine and advances with the end

tool slide, or can be accelerated. Secondary milling operations are eliminated.

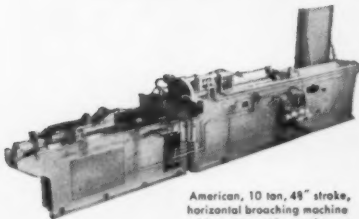
Concentricity is assured to 0.0001" accuracy, because the cutters rotate around the stock. Turnmill Inc., Dept. JS, 25450 Ryan Rd., Center Line, Mich.

Use ACTION Card, opposite page 64. Circle No. 116

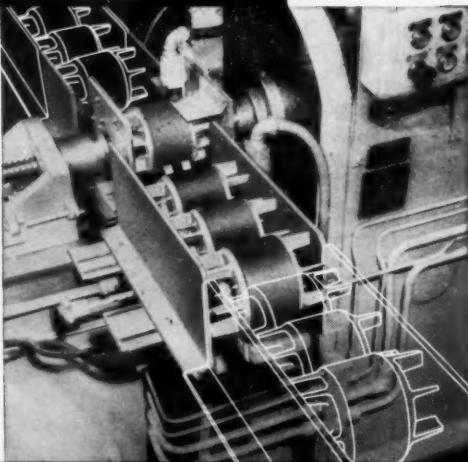


more about **AUTOMATION** by *American* ...

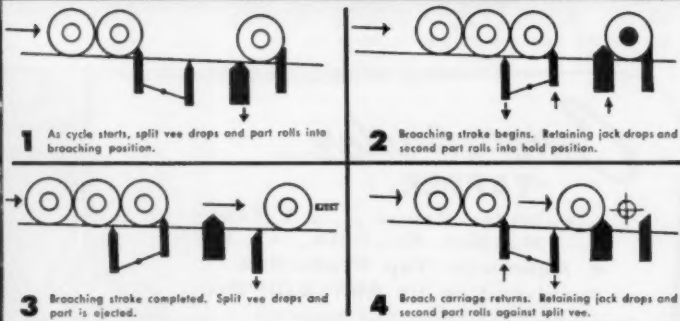
Broaching I.D. of rotors boosted to **200 PER HOUR**



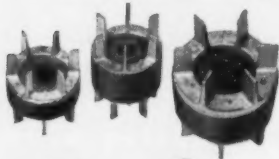
American, 10 ton, 48" stroke, horizontal broaching machine with automatic continuous broaching cycle.



PARTS FED AND EJECTED AUTOMATICALLY ON INCLINED CHUTE



MACHINE BROACHES DIFFERENT ROTOR SIZES



Thrust bushings on the clamping mechanisms seat in the I.D. of the rotors' fan sections. Simply by changing these bushings and adjusting the chute guides horizontally and/or vertically, rotors of varying diameters and thicknesses are broached on the same machine.

Whatever degree of automation is included in your production planning, if it involves broaching or machine assembly, American engineering can help you greatly. Phone or write us details.

Ask for Catalog No. 450

AMERICAN *American* **BROACH & MACHINE CO.**
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

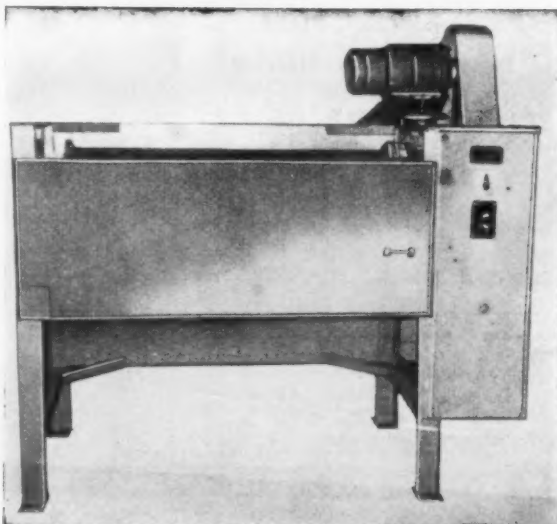


Barrel Finisher Offers Various Combinations

Made in any interchangeable combination of barrels—2, 4, 6, or 8 cu. ft. capacity—with total capacity of 8 cu. ft., this Rampe V-8 barrel finisher provides a versatility that will meet most requirements.

Improved power drive, with direct gears—no chains or sprockets—provides low maintenance cost. The 1½ hp magnetic brake motor has jogging and reverse switch. Rampe Mfg. Co., Dept. RH, 14915 Woodworth Ave., Cleveland 10, O.

Use ACTION Card, opposite page 64, Circle No. 102



Commander TAPPER

- Wider Range . . . 1 Tapper Handles No. 0 to ¾" Taps
- Automatic Tap Protection
- Furnished to fit ANY Drill Press

Commander—"The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced operators.

Your nearby Commander Distributor can give you a demonstration in your own plant. Write for his name and a copy of the NEW Commander Full Line.

COMMANDER MFG. CO.

4227 W. KINZIE STREET

CHICAGO 24, ILL.

Product of Commander . . . Builder of Production Tools



Any operator
does precision
tapping with
a *Commander*
TAPPER

Product of *Commander* . . . Builder of the *Multi-Drill*

Circle No. 410 on Card, Opposite Page 65

Only 7" high,
OMNI-VISE is lowest
in the trade.



Hold any machine work at any EXACT angle with sturdy OMNI-VISE!

Accurately set in all three planes in only 15 seconds, this sturdy precision vise made in two capacities saves time and headaches for progressive shop operators and pays for itself quickly. Only 7" high (lowest in the trade), OMNI-VISE #4, shown at top, is tough, weighs 74 lbs. Jaws are 4" x 1 1/2", open to 4". Base is 9" in diameter with one side straight. Inset shows OMNI-VISE #2, a precision low-priced vise. Users find it exceptional for grinding compound angles on carbide tools. Weight, 16 lbs. Height, 4 3/4". Jaws, 2 1/8". Opening, 2 1/8". Base, 7 1/4" x 5". For grinding, drilling or general work at any angle, by hand or machine, an OMNI-VISE is the machinist's choice.

Make any type spring, without arbors, FAST with Perkins Spring Coiler!

When you need a replacement or experimental spring, any shape, diameter or pitch from flat or round wire sizes .005" to .125", you can produce it in a matter of seconds with the new Perkins Precision Spring Coiler! You entirely eliminate the use of arbors, yet turn out precision springs — torsion, compression, extension tapered, or special springs — coiled either left or right hand, in any desired length, any diameter from 1/16" to 12" and larger, with or without initial tension, and with open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications for replacements or experimental work. Make them fast right in your own shop!



CONNORS AND DAVIS Sales Corp.
610A Circuit Ave., West Springfield, Mass.

Please send detailed information and prices on:

PERKINS SPRING COILER

OMNI-VISE #4 ☐ hand ☐ power ☐
#2 ☐

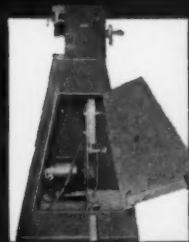
Name _____ Title _____
Company _____
Address _____ State _____
City _____

Circle No. 411 on Card, Opposite Page 65

EXCLUSIVE DISTRIBUTORS OF
PRECISION MACHINE
TOOLS

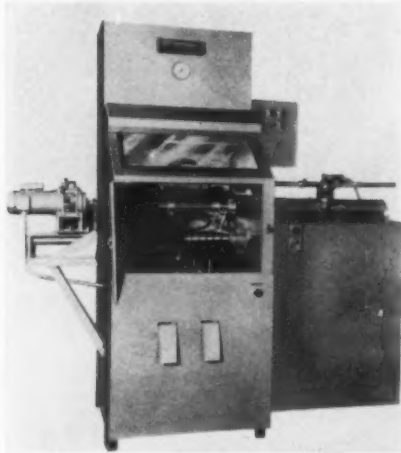
**Connors and Davis
Sales Corporation**

Power model
for continuous
runs, on welded
steel console base



Automated blasting unit

The simplicity of tooling a standard, manually operated pressure blast wet blasting unit for automatic operation is demonstrated by this new unit offered



by the Cro-Plate Co., Inc., Dept. MG, 747 Windsor St., Hartford, Conn.

A standard 30"x30" cabinet was fitted with an air-draulic cylinder to the right for the motivation of a blast gun cluster through a horizontal path. A small gear motor was positioned on the left to rotate a simple work-holding chuck within the cabinet. The adaptation was completed by eliminating the armports at the front of the cabinet and providing a loading door.

A unit of this type is practical for the automatic pressure blasting of small internal diameters, short outer diameters on cylindrical parts, etc.

Use ACTION Card, opposite page 64. Circle No. 103

Metallizing, hard-facing without compressed air

This metallizing gun permits the spraying of stainless steel and bronze, as well as hard-facing materials and ceramics in powder form, without the use of compressed air. Only a tank of oxy-

Extra Capacity with

hall COLLET CHUCKS

for
SPEED,
ACCURACY,
ECONOMY



Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over.

Tremendous grip over or under stock size.

Without adjustments. Shortest overhang. All grip...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

SATISFACTION GUARANTEED!

Made in Three Sizes to Fit Your Requirements:

Model A...1" (max. capacity 1-1/16")

Model B...2" (max. capacity 2-1/16")

Model C...3" (max. capacity 3 1/4")

Write today for illustrated catalog and price list - Dept. A-10

HALL MANUFACTURING COMPANY

827 TULAROSA DRIVE, LOS ANGELES 24, CALIFORNIA

Circle No. 412 on Card, Opposite Page 65

SLOCOMB micrometers

Greater Accuracy plus
Longer Wear



Always known for excellent performance, the new Slocomb Micrometer made by Connecticut machine tool craftsmen is better than ever with 14 exclusive features that mean greater accuracy and longer wear. Over 700 different models.

J. T. SLOCOMB CO.
Glastonbury, Connecticut

Circle No. 413 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

**TO MEET AND BEAT
HIGH PRODUCTION COSTS**
compare the blades you're using
with **STAR**

THE STAR BLADES GIVE ALL 5

1. Uniformity in fabrication
2. Proper Hardness
3. Efficient Tooth Design
4. Sufficient Set for Clearance
5. Clearly marked for Ease of Identification

Point 1 OF STAR'S 5 FEATURE CHECKLIST
UNIFORMITY IN FABRICATION

All saw blades are made by a step-by-step process. But the finished blade will be perfect only if each preceding step is perfect. Star Blades are uniformly perfect because every step in the Star manufacturing process is done on super-accurate automatic machines—under the supervision of highly skilled operators.

Nos. 10 & 15

No. 10—Green molded handle. Almost indestructible. Shaped for comfort. Patented Lever-Lock positions, tensions blades automatically. **No. 15**—Red molded handle, chrome-plate finish. Same features as No. 10.

No. 20

Long a favorite with mechanics, this gunmetal finish adjustable pistol-grip frame with lever for lock blade features extra easy blade change.

STAR BLADES

Manufactured by

CLEMMON BROS., Inc., Middletown, N. Y., U. S. A.

Makers of Hand and Power Hacksaw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemmon Lawn Machines

Clemmon Bros., Inc.
Middletown, N. Y., U. S. A.

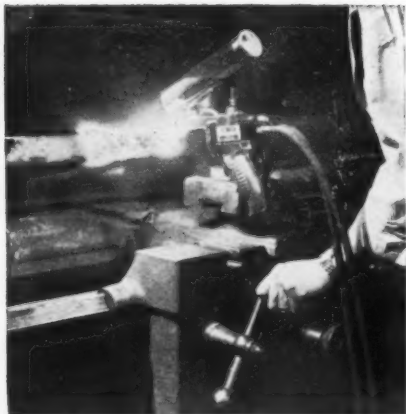
☐ Please send the STAR Metal Cutting Guide that contains information on blade types, cutting techniques, feeds and speeds and general metal cutting information.

☐ Please send the STAR Metal Cutting Chart—A handy guide for the shop metal worker.

Name

Address

City Zone State 1540



gen and one of gas and a few accessories are required.

The Metco Type P ThermoSpray gun and the special powdered metals for use with it have been developed by Metalizing Engineering Co., Inc., Dept. MG,

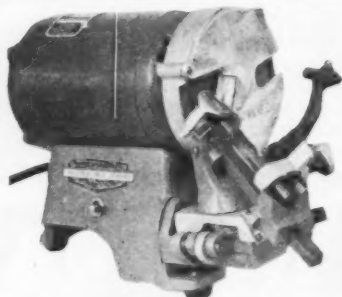
1101 Prospect Ave., Westbury, Long Island, New York.

Use ACTION Card, opposite page 64. Circle No. 104

Oscillating carbide tool grinder

The Hammond Model OCE-6 oscillating carbide tool grinder is adapted for either conventional grinding or, connected to a power pack, for electrolytic grinding. The oscillating spindle relieves the operator of the effort of manipulating the tool. The tool is held in stationary position, while the oscillating wheel does the work for him. This spindle also assures uniformly flat grinding and makes possible longer life for the diamond wheel, as the face is being uniformly worn and frequent dressings are not required.

Wheel oscillation has two variables—oscillations per minute and length of stroke. Both are controlled by handwheels. Oscillations can be adjusted



THE TWIN-SET ARISTOCRAT DRILL GRINDERS

SHARPEN DRILLS ACCURATELY

Grind all drills from No. 55 thru 1/2 inch on standard angles of 49°-59° and 69°. One setting of either lip permits precision grinding of both lips with full bodied cutting edges.

Send Today For Folder & Prices

CLARKE SPECIALTY COMPANY
ORANGE PARK, FLORIDA

Sold only through authorized dealers

Circle No. 415 on Card, Opposite Page 65

CLIPPER

PRECISION DIAMOND TOOLS

Industrial Diamonds
Thread Grinders
Turning Tools
Engraving Tools
Dressing Tools
Diamond Powder

Manufacturers of DIAMOND WHEELS

and Hones of
highest quality.
Prompt deliveries.

Ask for literature

Representatives in Principal Cities

CLIPPER DIAMOND TOOL CO., INC.

345-D HUDSON ST. NEW YORK 14, N.Y.

Circle No. 416 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK



Precision Ground tools cut from solid carbide

In addition to our standard line of fine Carbide tools, specials are given our immediate attention.

Quotations are invited.

A complete regrind department is at your service.

Center-Laps

Reamers

End-Mills

Grinding Tools



Some
Territories
Available



Solid Carbide Plug Gauges

Send For Catalog Today!

R. L. Schmitt COMPANY

BOX 1082

ALLEN PARK, MICHIGAN



between 0 and 70 per minute. Length of stroke, or amplitude, can be varied to accommodate tools from $\frac{1}{4}$ " to 2" face, using a $\frac{3}{4}$ " face diamond wheel. Hammond Machinery Builders, Inc., Dept. HS, 1614 Douglas Ave., Kalamazoo, Mich.

Use ACTION Card, opposite page 64. Circle No. 105

Sequence valves

Sequencing type air circuits can be controlled by sequence valves recently introduced by Ross Operating Valve Co., Dept. JS, 120 E. Golden Gate Ave., Detroit, Mich. The TD and WV sequence valves provide for a preset pattern of operations to be automatically carried out by a machine after the operator initiates the cycle. Cylinders can be sequenced by position or time and their action interlocked in the circuit.

When a pilot valve is operated, it provides the retold (remote control) valve with air through an opening in the head reversing the valve. Exhaust-

▶

do you have a

TOOL PROBLEM

Columbus Die-Tool has been solving tooling problems for over 50 years. Expert designers and builders of all types of tools and special machinery. Write us today!

COLUMBUS DIE-TOOL
and Machine Co.

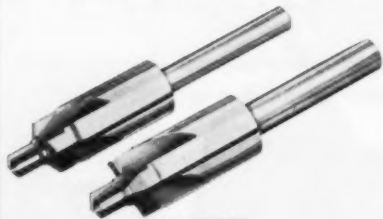
P. O. BOX 750 • COLUMBUS, OHIO

Circle No. 418 on Card, Opposite Page 65

270

NOW...PORTING TOOLS

AVAILABLE FROM STOCK



AND-10050

A complete line of carbide tipped combination ream, counterbore and facing tools to form AND-10050 standards. Tube sizes 2 through 24 in turret lathe and drill press types. Special tools made to order.

Send for valuable data sheet

WETMORE TOOL & ENG. CO.

Engineers Designers Manufacturers

5318 E. Washington Blvd.
Los Angeles 22, Calif.

AN 9-7266

Circle No. 419 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

**There Are Many
NEW APPLICATIONS**

Never Before Associated With Finishing

**FOR TODAY'S
RUBBER-CUSHIONED
ABRASIVES!**

**Replacing
Costlier,
Slower
Methods**



TIME SAVINGS FREQUENTLY 50%

BURRING, CLEANING, FINISHING, POLISHING—IN ONE OPERATION



Investigate Brightboy's unique rubber-and-abrasive action, which you must see to believe! It has pioneered a completely new concept of finishing, widely broadening the scope of abrasive applications.

Readily available multi-use Brightboy stock grains and textures are job-matched to your work. In many instances they completely eliminate the expense and delay of ordering "specials".

Choose from the wide range of Brightboy abrasive grains in Silicon Carbide and Aluminum Oxide. Grains and textures range from extra fine to extra coarse—ALL in soft, firm and tough rubber binders.



Ask your dealer for Brightboy recommendations and for the Brightboy Catalog listing grains, textures, machine speeds and work suggestions. Write us if he cannot supply you, or on any problem in which finishing is involved.



BRIGHTBOY INDUSTRIAL DIVISION, WELDON ROBERTS RUBBER CO., 95 North 13th St., Newark 7, N.J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives

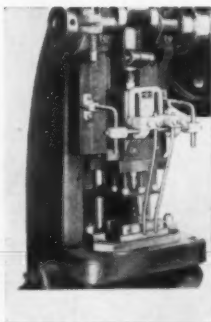
Circle No. 420 on Card, Opposite Page 65

**economically priced
press room equipment**

**DURANT
Sweep Guard**

A positive safety guard on power presses. Rugged. Needle bearings assure long life. List price from \$58.00.

Manufacturers of
Stock Reels, Roll
Feeds, Straighteners,
Scrap Choppers, Die
Pullers, Foot Presses,
Coil Cradles, Press
Guards, Stock Oilers.



WRITE FOR NEW FREE CATALOG
DURANT TOOL SUPPLY CO.
PROVIDENCE 3, RHODE ISLAND

Circle No. 421 on Card, Opposite Page 65

Greenerd

**ARBOR
PRESSES**

For Assembling: Key-
way Cutting, Broach-
ing, Piercing, Oil
Grooving, Straighten-
ing, Forming, Press-
ing, and many other
jobs.

65 Standard styles
and sizes.

From 1/4 to 20
tons pressure for
manually oper-
ated presses.

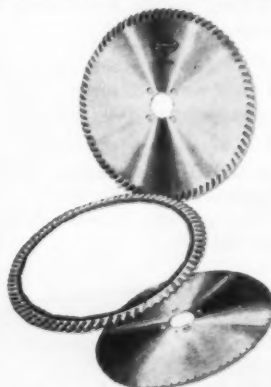
From 1 1/2 to 75
tons pressure
for motor
driven hy-
draulic
presses.
Originators
of the Arbor
Press.

Send for
Cat. 40-H



GREENERD ARBOR PRESS CO.
141 CROWN ST. NASHUA, N.H.

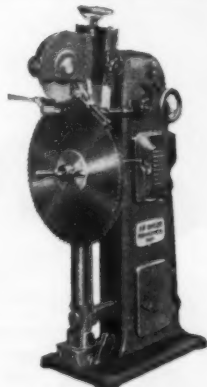
Circle No. 422 on Card, Opposite Page 65



Ohler

**SEGMENTAL SAW
BLADES AND
SAW SHARPENING
MACHINES**

by the originators of
SEGMENTAL TYPE SAW BLADES
with
CURVED TOOTH FORM
for
TRIPLE CHIP CUTTING



SEND FOR OUR NEW BLADE CATALOG CONTAINING FULL TECHNICAL & ILLUSTRATED DATA.

EXCLUSIVE FACTORY AGENT

JAMES W. GEORGE MACHINERY CO.
519 E. Jefferson Ave. Detroit 26, Mich.

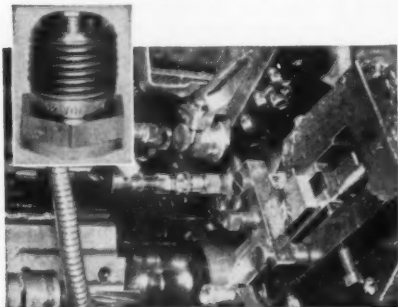
OR YOUR DEALER

Circle No. 423 on Card, Opposite Page 65

(Advertisement)

OVER 8-MILLION SCREW MACHINE PARTS MARKED AUTOMATICALLY AT TWO CENTS PER THOUSAND

Automatically marking over 8-million parts such as these automotive couplings (inset) with a 21-character impression at a total cost of less than two cents per 1000 parts for complete marking equipment was accomplished by employing a single standard Model 500-C automatic roll marker and die manufactured by New Method Steel Stamps, Inc., 147 Joseph Campau, Detroit. Marking equipment is still in perfect condition.



According to J. B. Cote, President of Berlew Products, Inc., Ferndale, Michigan, total maintenance cost on the several marking operations consisted of 90 cents for a new reset spring during the 4½ years the lone marking unit has operated on the 1¼" Acme-Gridley shown tooled for the job. Cote indicated that the cost of marking these products on a secondary operation would have been many times greater due to time and labor costs involved, reduced production output and increased losses from imperfect marking.

The 8-million parts were machined from ½" hexagonal brass bar stock and were marked with a single roll die which is still in continuous operation. Use of an offset roll die permitted marking within 3/64" of the hex head. Versatility of the roll holder permits marking of many different parts with a single unit, using standard interchangeable New Method roll dies.

Marking one part every six seconds, the automatic marking unit turned out the 8,000,000 parts in a period equal to over 4½ years of continuous operation, 8 hours per day and every day of the month.

Circle No. 424 on Card, Opposite Page 65

October, 1954



ing the pilot valve circuit returns the retrold valve to its normal position.

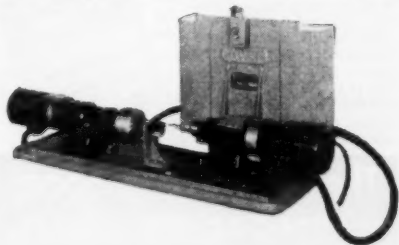
Three types of valve heads control these valves. MV retrold valves have immediate actuation and immediate reversal. The TD sequence valves have delayed actuation and immediate reversal. The WV sequence valves have immediate actuation and delayed reversal.

Models include straightways and three-ways, normally opened and normally closed. They are provided for in-line mounting, in sizes ¼" to 1¼". These models are also built in two inch size for MV type operation.

Use ACTION Card, opposite page 64. Circle No. 108

Drilling machine performs three operations

This bench-type drilling machine, by means of two automatic drilling units, one with a 2-spindle head, performs two drilling and one counterboring operation automatically with one loading. The operator loads and clamps the part in a simple fixture, then depresses the



WALTON *Specialized* TOOLS

**TIME AND
MONEY
SAVERS**

**TAP
EXTRACTOR**



**"Multi-Position"
TOOL
HOLDER**



**PIPE,
STUD
AND
SCREW
EXTRACTOR**



WALTON Specialized TOOLS will outperform all ordinary tools and methods in doing one special job particularly well.

Write us for Data Folder No. 12 giving sizes, prices, and complete specifications.



**The WALTON Company
HARTFORD 10, CONN.**

start-cycle switch, whereupon the left-hand drilling unit automatically feeds forward and drills two holes. The withdrawal of the spindles causes the right-hand unit to feed in automatically to counterbore one of the two holes previously drilled.

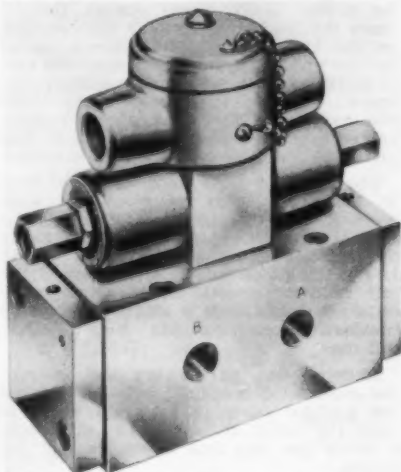
With this simple setup, the three operations are performed automatically at an output rate in excess of 300 pieces per hour. By making slight changes in mounting and fixtures, the machine is readily adaptable to drilling a variety of parts. Govro-Nelson Co., Dept. JS, 1933 Antoinette, Detroit 8, Mich.

Use ACTION Card, opposite page 64. Circle No. 107

Valves control air-operated devices

Flo-Line solenoid and master air valves, for three- and four-way operation, are available in sizes of $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", and 1". Valves are used for controlling air cylinders and other air operated devices. Seals eliminate damage from external grit and moisture. Parts subject to wear are instantly replaceable. Valves have a built-in junction box for convenient piping of conduit. Hanna Engineering Works, Dept. RB, 1765 Elston Ave., Chicago 22, Ill.

Use ACTION Card, opposite page 64. Circle No. 108



Buck **CHUCKS**

**"Hold O.D. and I.D. within
.001" day in and day out."**



Buck Adjust-Tru chucks are ideal for precision grinding. Most recent report is from Mr. Chester Nelson, Supt. Press & Machine Div., J. I. Case Company, Bettendorf, Iowa. He writes —

"The part has been O.D. ground on a Centerless Grinder first, then the I.D. is ground by being held in the six (6) jaw Buck Chuck. The accuracy of the Buck Chuck is used to its fullest extent since the O.D. and I.D. have to be concentric within .001" total indicator runout. This tolerance is being held constantly day in and day out."

You, too, can handle precision grinding *faster and at less cost* with Buck Adjust-Tru chucks. Takes but a moment to send for literature — write today.

Do you use Power Chucks?

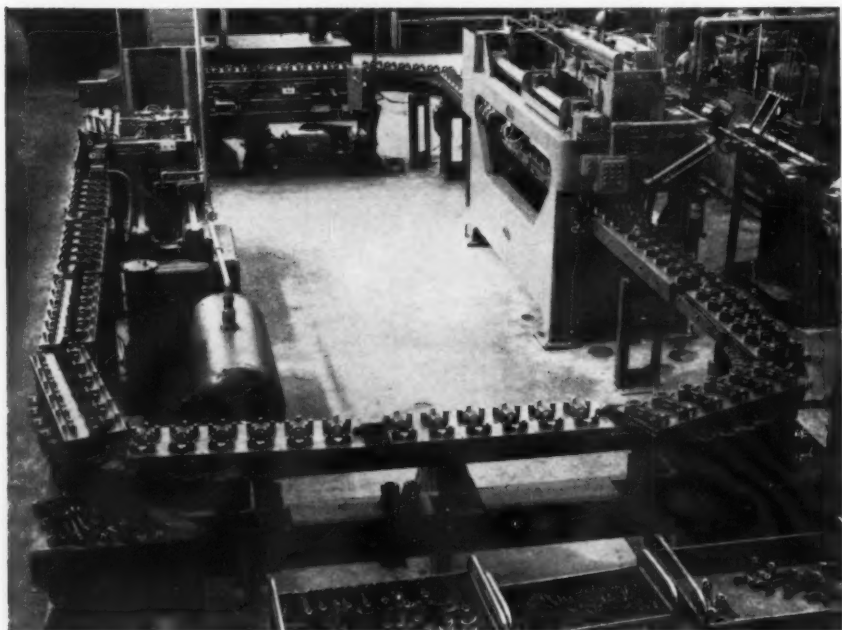
Ask for information about the new
Buck standard and Compensating chucks
— up to 12".

BUCK TOOL COMPANY

1012 SCHIPPERS LANE • KALAMAZOO, MICHIGAN

Circle No. 426 on Card, Opposite Page 65

Assembly System Bolts Bearing Caps For 2000 Connecting Rods per Hour



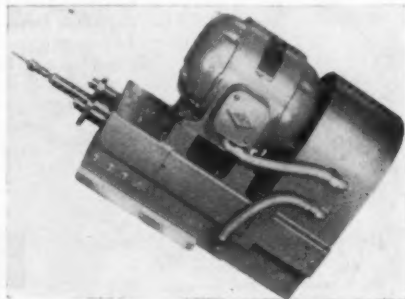
An automatic assembly system which bolts bearing caps in place on automobile engine connecting rods has a capacity of 2000 rods per hour. The bolt-press unit is electro-hydraulically powered; the nut-setting unit is electro-pneumatically powered. This system was built by Cleco Div., Reed Roller Bit Co., P.O. Box 2119, Houston, Texas, for a major automobile manufacturer.

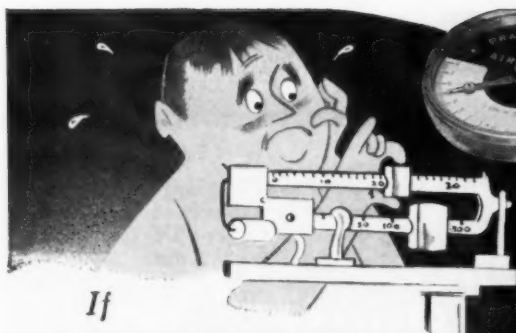
The connecting rods enter on fixtures on a continuously moving conveyor, ready for the bolts to be pressed in and nuts set. The operations are performed while the connecting rods are traveling on the conveyor at a speed of approximately 22.8 feet per minute. The bolt press and nut setter are available to receive a fixture every 10.6 seconds.

Use ACTION Card, opposite page 64. Circle No. 109

Lead-screw tapping unit operates in any position

A lead-screw tapping unit which measures only 24½" in length, 11" in width, and 17" in height is built to drive a ¾" tap in cast iron, or a group of taps up to this capacity. It has a 4" spindle





If
PRODUCT PRECISION
 and **QUALITY** are
WEIGHTY PROBLEMS
 rely on
THESE **SCALES**

PRATT & WHITNEY BENCH COMPARATORS

- SIGMATIC MECHANICAL COMPARATORS
- AIR-O-LIMIT COMPARATORS
- ELECTROLIMIT COMPARATORS

Whatever your requirements, there's an easy-to-read P&W Bench Comparator just right to streamline your quality control procedures, tighten up your precision standards, and trim down your cost-of-inspection figures. Almost any magnification from 300 to 110,000 times can be supplied. Write today for complete information, outlining your specific quality control needs.



PRATT & WHITNEY COMPANY

INCORPORATED

22 Charter Oak Boulevard, West Hartford 1, Connecticut

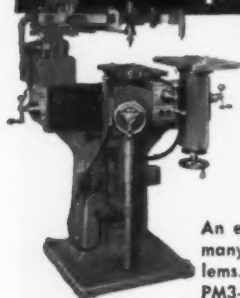
Branch Offices and Stocks in Principal Cities

MACHINE TOOLS • GAGES • CUTTING TOOLS

Circle No. 427 on Card, Opposite Page 65



3-Dimensional panto-miller

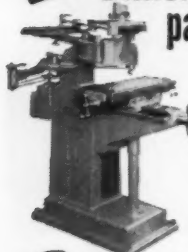


Accurate pantographic milling on either flat or curved surfaces.

New
CAPACITY
SENSITIVITY
ACCURACY
CONTROL

An economical answer to many production problems. Send for Bulletin PM3-A.

2-Dimensional panto-miller



Versatile and dependable for continuous service, the J&B "Panto-Miller" 2A:

ENGRAVES
PROFILES
DIE CUTS
MILLS

Write for Bulletin PM2-A.

3-WAY Indexing Trunnion

Simple, Rapid, Positive positioning of workpiece or jig for all angle Drilling, Tapping, or Counter-boring. Available with Chuck, Faceplate, or Right-Angle Adaptor Plate. Complete with Station Selector. For details, ask for Bulletin IT3-A.



WITH
FACE
PLATE



WITH
RIGHT ANGLE ADAPTOR



JOHNSON & BASSETT INC.
PRODUCTION TOOL DIVISION
WORCESTER, MASSACHUSETTS

travel, and can be used in any position.

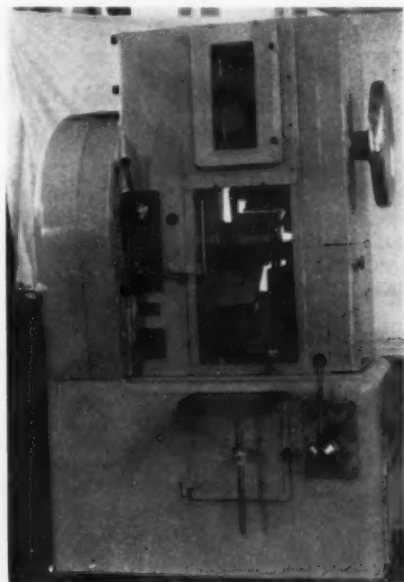
Built-in electrical relays allow automatic or manual cycling. Unit is provided with its own control panel and capable of 30 reversals per minute. To avoid tool breakage in the event a tap hits a blind hole, a built-in, automatic safety clutch and spring-loaded spindle automatically protects the tool and at the same time warns the operator and returns the spindle. Johnson Drill Head Co., Dept. RB, 23rd Ave. & 20th St., Rockford, Ill.

Use ACTION Card, opposite page 64, Circle No. 110

Improved briquetting presses

One shot, central lubrication, a special volume controlled filler shoe mechanism, and a new core rod bracket are among additions to mechanical briquetting presses developed by Haller, Inc., 684 Ann Arbor Rd., Plymouth, Mich.

Lubrication system reaches 21 points in the press, including the clutch, main



**Precision Cuts
on Ferrous or
non-Ferrous
Metals**

Automatically with **STONE'S
NEW MODEL M-75
BAR-FEED CUT-OFF MACHINE**

M-75 FOR FERROUS METALS CUTTING: Now . . . cut up to 550 pieces per hour of 1½" solid rounds or other shapes with a mill-like finish, and with no change in metal characteristics! Even on the longest production runs, the M-75 holds tolerances of $\pm .005$ " day in, day out. That's due to Stone's exclusive Automatic Wheel Wear Compensator, which adjusts for fast approach and regulated speed of cutting cycle by hydrocheck. Cutting head is engineered with geared-in-head drive, another Stone exclusive, to deliver maximum power at lowest cost.

M-75 FOR NON-FERROUS CUTTING: Possesses most of the features of the M-75 described above, with the exception of Automatic Wheel Compensator. Handles solid stock up to 3½" in diameter, or 4"-pipe and structurals . . . giving up to five times greater production.

M-35A MANUAL CUT-OFF MACHINE: Holds milled-finish tolerance of $\pm .005$ " on ferrous and non-ferrous materials at any degree of cut up to 45°—either direction. Geared-in-head drive. Cuts at less than 4 seconds per square inch.

SS-20LR TRAVERSE TYPE MACHINE FOR CUTTING SHEET OR PLATE STOCK: Cuts 4', 8' or 12' lengths with great accuracy due to rigid construction of base, and work stop mounted parallel to kerf. Control-panel or hand operated as desired.

**MODEL
M-75**



See all the newest
**STONE Models at the
METAL CONGRESS
SHOW . . . BOOTH 2011**

"...represented in every
major industry throughout
the world"

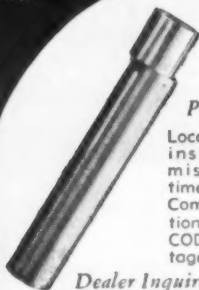
STONE MACHINERY COMPANY, INC.
Sales and Service in Principal Cities

**11 Fayette St.
Manlius, N.Y.**



JUMP EDGE FINDER

Locates edge in one
minute within .0005



\$2.50
Each

Prepaid orders

Locates edge or step
instantly and un-
mistakably every
time within .0005.
Complete satisfac-
tion or money back.
COD order plus pos-
tage.

Dealer Inquiries Invited

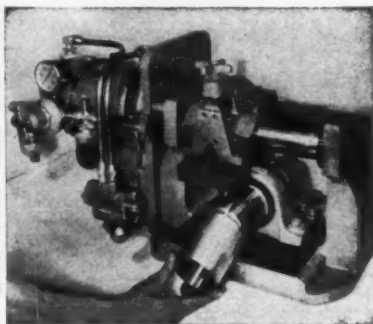
ELISHA PENNIMAN

460 South Main St.

WEST HARTFORD 10, CONN.

Circle No. 430 on Card, Opposite Page 65

MARK 500 or more parts per hour Trade-Mark, Number Graduate



WRITE FOR 9AA Data today.

"The
Original
Marking
Specialists"

ACROMARK
Company

15 Merrell St.
Elizabeth, New Jersey

Circle No. 431 on Card, Opposite Page 65

Beverly THROATLESS SHEAR

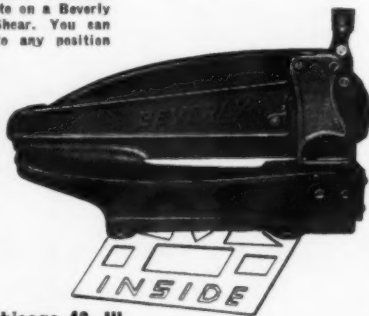
Cut any Shape... **STRAIGHT OR
IRREGULAR**



B-3 with Ball
Bearing Hold
Down

Make any cut — curved,
straight or irregular, faster,
easier and better with less
material waste on a Beverly
Throatless Shear. You can
turn work to any position

and make a
clean cut as you
go. Handles
heavy gauges
with ease—light-
or metals without
distortion. 4
models — capaci-
ties 16 gauge to
3/16" mild. All
shears equipped
with H.C. H.C.
Blades for cut-
ting Stainless.



INSIDE SLOTTER

8" Reach — 16 ga. cap.
Makes inside slotting cutting
faster, easier, cleaner. Punch
and die arrangement of 5
blades assures accuracy, clean
cutting action. Cuts 2 1/2"x1/4"
slot at one stroke. Throat
design permits pivoting work
at any point in stroke for
special inside cuts. Note
sample cuts at left.

See your Beverly Dealer
or write for illustrated
catalog.

BEVERLY SHEAR MFG. CO., 3005 W. 111th St., Chicago 43, Ill.

Circle No. 432 on Card, Opposite Page 65

bearings, and all moving parts. A separated filler shoe insures a measured amount of powder into the die in any desired quantity. Divided into two sections, a hopper and the shoe, the mechanism is cam operated to deliver a predetermined quantity of powder to the shoe. This is the portion that moves over the die. A damper between this section and the hopper is actuated by a cam-preset for the desired amount. As

a result, parts are made with a consistently uniform volume of material. The new core rod bracket permits the use of short core pins attached to a stationary core rod.

Use ACTION Card, opposite page 64. Circle No. 111

Printed circuit drilling

For drilling printed circuits, a simplified version of Zagar gearless drill heads now makes possible easy change of hole patterns to be drilled. The hole



DUST COLLECTORS



37 STANDARD MODELS



SAVES INSTALLATION TIME

Stop dust quickly, at lower cost, with Dustkop. Thirty-seven standard models *ready to use* and available from stock. Dustkop conserves floor space, reduces maintenance. Collects almost all types of industrial dusts. Write for descriptive literature.

Also a complete line of Mist Collectors

AGET MANUFACTURING COMPANY
1402 East Church St. • Adrian, Michigan

for **CONVEYING
MELTED COMPOUNDS
WITHOUT TEMPERATURE
DROP...**



Specify STA-WARM HEATED PIPE

The Sta-Warm Method of electrically heating plain steel (or stainless) pipe of any practical diameter or length up to 20' per section, will provide you with a method of conveying melted compounds from heating tank to point of use without a critical drop in temperature.

A thermostat in each section of pipe assures accurate temperature control so material will flow readily through a 50' or a 500' length of line to point of dispensing.

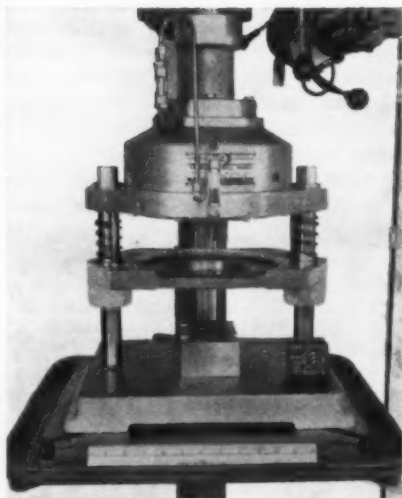
Heated pipe is but one of the items in the complete Sta-Warm line for melting, conveying and dispensing heated compounds efficiently and economically. Other items include a complete line of melting tanks, heated valves, heated flexible hose and dispensing nozzles.

INQUIRE FOR DESCRIPTIVE BULLETINS TODAY

***Sta-Warm*
ELECTRIC CO.**
756 N. CHESTNUT ST., RAVENNA, OHIO
Subsidiary of ABRASIVE & METAL PRODUCTS CO.

Circle No. 434 on Card, Opposite Page 65

282



pattern is drilled simultaneously in three Formica plates.

Holes as close as .140" between spindles can be drilled. A rectangular pattern up to 6" x 14" is the capacity range. The series is not designed for large runs. Zagar Tool, Inc., Dept. RH, Lakeland Blvd., Cleveland 23, O.

Use ACTION Card, opposite page 64. Circle No. 112

Electric throatless shear

An electric powered throatless shear recently introduced by the Beverly Shear Manufacturing Co., Dept. MM, 3004 W. 111th St., Chicago, for cutting metal up to 10 gauge mild steel, is complete with its own base and supporting column. By removing the column, the machine may be used with the base only as a bench shear.

The eccentrically mounted cutter head imparts a downward-forward motion to the upper blade which shears the metal rather than punching through it. This provides fast, clean cutting, longer blade life and less blade sharpening.

Cutting to a line or template is possible because the operator may use both hands to feed and guide the work through the shear. Throatless design

MACHINE and TOOL BLUE BOOK

SID TOOL COMPANY, INC.

Your headquarters for Special
Taps and Drills now stocks...

HIGH
SPEED

SPECIAL SIZE

MILLING
CUTTERS



SIDE MILLING CUTTERS

Precision made in U.S.A.

**IN STOCK FOR
IMMEDIATE DELIVERY!**

DIAM- ETER	WIDTH OF FACE	SIZE OF HOLE	PRICE EACH
4	7/32	1	11.40
4	9/32	1	13.35
4	5/16	1	13.70
4	7/16	1	15.05
4	9/16	1	17.15
4	11/16	1	18.10
4	13/16	1	20.85
4	15/16	1	22.95
4	1	1	23.65
4	1 - 1/8	1-1/4	25.75
4	1 - 1/4	1-1/4	28.35
5	1/4	1	17.50
5	5/16	1	17.80
5	3/8	1	19.70
5	7/16	1	20.95
5	9/16	1	23.55
5	11/16	1	26.30
5	13/16	1	28.35
5	7/8	1-1/4	30.50
5	15/16	1	31.50
6	1/4	1	21.60
6	5/16	1	22.10
6	3/8	1	23.70
6	7/16	1	25.30
6	9/16	1	31.20
6	11/16	1-1/4	33.45
6	13/16	1-1/4	35.75
6	7/8	1	36.65
6	15/16	1-1/4	38.50
8	1/4	1	47.70
8	5/16	1	49.70
8	3/8	1	51.05
8	7/16	1	53.70
8	1/2	1	54.55
8	9/16	1-1/4	56.65
8	5/8	1-1/4	57.50
8	11/16	1-1/4	59.35
8	13/16	1-1/4	60.50
8	7/8	1-1/4	62.20
8	15/16	1-1/4	63.85
10	1/4	1-1/2	87.85
10	5/16	1-1/2	88.90
10	3/8	1-1/2	83.75
10	1/2	1-1/2	92.30
10	5/8	1-1/2	105.35
10	3/4	1-1/2	121.50
10	7/8	1-1/2	131.95
10	1	1-1/2	136.70
12	1/2	1-1/2	153.95
12	5/8	1-1/2	169.75
12	3/4	1-1/2	174.35
12	7/8	1-1/2	220.10
12	1	1-1/2	236.60

STAGGERED TOOTH SIDE MILLING CUTTERS

Precision made in U.S.A.

**IN STOCK FOR
IMMEDIATE
DELIVERY!**



DIAM- ETER	WIDTH OF FACE	SIZE OF HOLE	PRICE EACH
5	1/4	1-1/4	20.95
5	5/16	1-1/4	21.85
5	3/8	1-1/4	23.20
6	5/16	1-1/4	30.80
6	7/16	1-1/4	31.85
6	9/16	1-1/4	36.70
6	11/16	1-1/4	40.05
6	13/16	1-1/4	42.15
6	15/16	1-1/4	44.55
8	5/16	1-1/4	63.20
8	7/16	1-1/4	66.80
8	9/16	1-1/4	70.55
8	11/16	1-1/2	75.65
8	13/16	1-1/2	79.35
8	7/8	1-1/2	83.25
8	1	1-1/2	87.35
10	1/4	1-1/2	87.80
10	5/16	1-1/2	89.10
10	3/8	1-1/2	90.15
10	7/16	1-1/2	95.70
10	1/2	1-1/2	99.75
10	5/8	1-1/2	110.85
10	3/4	1-1/2	113.10
10	7/8	1-1/2	129.35
10	1	1-1/2	133.30
12	1/2	1-1/2	139.20
12	5/8	1-1/2	160.45
12	3/4	1-1/2	170.95
12	7/8	1-1/2	181.45
12	1	1-1/2	221.65
12	1	1-1/2	238.95

DEALER INQUIRIES INVITED

If you are a user of cutting tools it will pay you to be on our mailing list. We also stock special and standard sizes in slitting saws, end mills, etc. Write for circular now to Dept. B.

SID TOOL COMPANY, INC.

Cutting Tool Specialists

158 LAFAYETTE ST., NEW YORK 13, N. Y.

Telephone: BEekman 3-4270

Spin your RIVETS

better and
more economically
on the NOISELESS

LINLEY RIVETER



Rivet spinning on the Linley is a sure way to cut production costs. With Linley equipment you can easily produce finely finished rivets even in close places. Send us samples of the work you want riveted, and without obligation we'll show you how it can be done the Linley-way and what it will cost.

Machines available for handling iron and cold rolled steel rivets up to $\frac{3}{4}$ " and larger size rivets in softer materials.

Send for Bulletin R today.

LINLEY BROTHERS CO.

Also builders of JIG BORERS

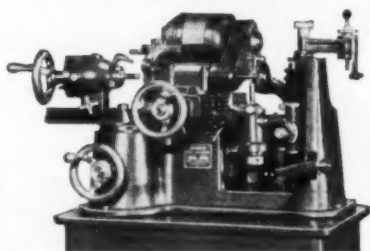
663 State St. Ext. Bridgeport 1, Conn.

Circle No. 436 on Card, Opposite Page 65

HYBCO

TAP GRINDER

Sharpens Chamfers, Flutes
and Spiral Points



Model 1100

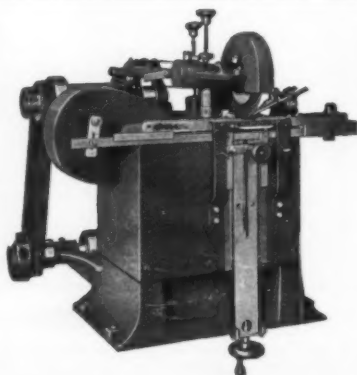
- Capacities No. 0 Machine Screw to $1\frac{1}{2}$ " Hand Taps

HENRY P. BOGGIS & CO.

710 E. 163rd St.

Cleveland 10, Ohio

Circle No. 437 on Card, Opposite Page 65



WARDWELL
MANUFACTURING CO.

3807 Ridge Rd. Cleveland, O.

Maker of largest line of saw and tool sharpening machines

Make Money on This One!

by sharpening just one gross of hack saw blades (at least 6 times) you actually will save the price of this machine.

WARDWELL MODEL EC COMBINATION GRINDER is the only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

Write for Bulletin EC Today

Circle No. 438 on Card, Opposite Page 65



permits turning the sheet in any direction during the cut. Powered by a 60 cycle, 120 V AC motor, which is direct-connected to the cutter head, the shear produces 1725 cutting strokes per minute. It will slit 12 gauge mild steel at the rate of 15 ft. per minute.

Use ACTION Card, opposite page 64. Circle No. 113

WALLS TU-WAY BELT SANDER

**USE IT
EITHER WAY**

VERTICAL

HORIZONTAL

Full 1/3 h.p. O. E. Motor

At last, a top quality industrial sander that provides all the most wanted features - yet sells for so little. **\$89.95**

complete with cord, plug, switch ready to use

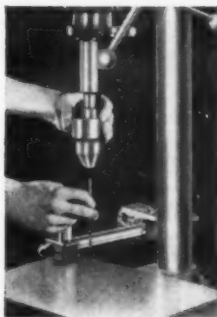
Illustrated Literature on Request

A few desirable distributor territories still available.

WALLS SALES CORPORATION
333 Nassau Avenue Brooklyn 22, N. Y.

Circle No. 439 on Card, Opposite Page 65

CHANGE TOOLS IN SECONDS, SAFELY!



Spindle never stops. To open - pull down. Jaws open automatically, release tool. To close - insert new tool. It's locked and centered.



Model A - capacities from $\frac{1}{8}$ " to $\frac{3}{8}$ " and $\frac{1}{32}$ " to $\frac{1}{2}$ " available with Nos. 1, 2 and 3 Morse Taper Shanks and Taper Adapters.

Drill, ream, counterbore with one spindle, without stopping spindle or moving work.

No keys, collets or wrenches are needed on Wahlstrom Fully Automatic Chucks and Tapping Attachments. Tool is automatically centered. Grip can't slip or chew tool shank. Wahlstrom Chucks convert 95% of lost tool changing time to productive time. And, a single chuck does work of several spindles. Write for spec. folder and distributor name. Made by the makers of the Float-Lock Industrial Vise.

Another  Product
WAHLSTROM
AUTOMATIC CHUCKS

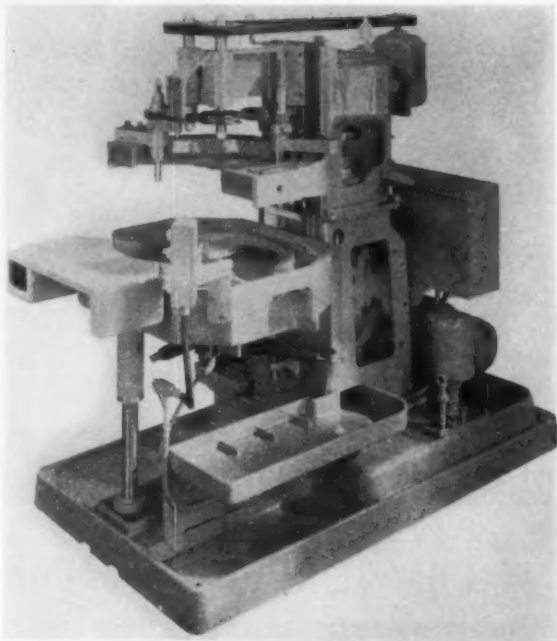
AMF TOOL DIVISION
AMERICAN MACHINE & FOUNDRY COMPANY
224 Glenwood Avenue, Bloomfield, New Jersey

Circle No. 440 on Card, Opposite Page 65

Special Machines Built on "Do It Yourself" Plan

For mass production and assembly operations on small - to - medium - sized metal and plastic parts, the Bodine basic machine has been re-fined down to a chassis, available in four sizes, which can be tooled for a practically unlimited range of work by the arrangement of standardized indexing, feed and spindle units. These basic machines and tooling components are offered either separately or in any desired combination to those who may wish partially or wholly to design and assemble their own special machinery.

Typical work cycles can include drilling, reaming, tapping, milling, screw inserting and a variety of assembly operations. All operations are mechanically interlocked, eliminating complicated air feeds and



electrical interlocks. The Bodine Corp., Dept. MG, Bridgeport 5, Conn.

Use ACTION Card, opposite page 64, Circle No. 114

Dual Electric Indicator Measures Swivel Table Adjustment

To provide accurate control for grinding close tolerance tapers, Norton Co., Dept. JP, Worcester 6, Mass., has developed a Swivalign dual electric indicator for measuring swivel table adjustment.

This device, applicable to Norton cylindrical and universal grinding machines, simplifies the adjustment of swivel tables to correct errors in grinding exact tapers or to eliminate taper in straight work.

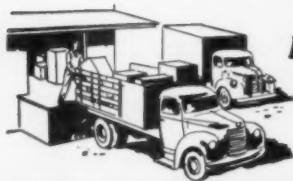
It consists of one electrical pick-up unit with zero adjusting knob at each

end of the swivel table and a two channel amplifier having a pair of indicating meter elements reading on a common scale. Each meter needle responds to movements of only one of the pick-up elements.

Connections are so arranged that both needles move in the same direction of rotation as the swiveling of the table.

Divisions on the meter scale indicate directly taper changes in thousandths of an inch per foot of taper. Two ranges of readings, one for extremely accurate settings with graduations of .0001" per

WE SPECIALIZE IN HIGH SPEED CUTTING TOOLS



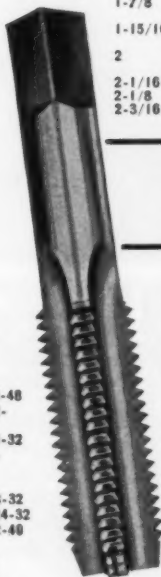
**IN STOCK FOR
IMMEDIATE
SHIPMENT**

All Tools Sold On A
Money Back Guarantee

**Special
Taps**

HIGH SPEED RIGHT HAND TAPS

SIZE	THREAD
4	32-48-60-84
5	30-32-36-48-80
6	36-40-48-56-60
7	32-40-48
8	24-30-36-38- 40-44-48
9	24-28-32-40-48
10	28-30-36-40-48-64
12	20-28-32-36-48
14	20-24-28
1 1/8	60-64
1 1/4	36-48-72
1 1/2	48-56-60
1 3/4	48-56-60
1 1/2	32-40
1 3/4	32-36-40-48
1 1/2	36-40-48
1 3/4	36
1 1/2	20-24-32
1 3/4	32-36-48
1 1/2	24-28-32
1 3/4	18-24-26-27- 30-32-36-40-48
1 1/2	16-20-22-27- 28-32-36-40
1 3/4	12-16-18-20-27-28-32- 36-40-48
1 1/2	12-16-18-22-24-27-28- 30-32-36-40
1 3/4	12-14-16-18-22-24-26- 27-28-30-32-36-40
1 1/2	16-20-24-27-28-30-32-40-48
1 3/4	12-14-16-20-24-27-28-32- 36-40
1 1/2	11-16-18-20-24-27-28-30-32
1 3/4	9-11-12-14-18-20-24-26- 27-28-32
1 1/2	10-14-16-20-27-32
1 3/4	10-12-16-18-20-24-27-28-32
1 1/2	8-9-10-12-14-16-18-20-24-32
1 3/4	10-12-16-18-20-24-27-32-40
1 1/2	12-14-16-18-20-24
1 3/4	8-10-14-16-18-20-24-32
1 1/2	8-10-12-14-16-18-20-24
1 3/4	8-10-14-16-18-20-24-32
1 1/2	12-14-16-18-20-24-32
1 3/4	8-10-14-16-18-20-24
1 1/2	8-10-12-16-18-20-24
1 3/4	8-10-14-16-18-20-24-28
1 1/2	18-20-24-36
1 3/4	9 1/2-8-10-12-13-16-18-20-24
1 1/2	10-12-14-16-18-20-24



SIZE	THREAD
1-3/4	8-10-12-14- 16-18-20-24
1-13/16	8-10-12-14- 16-18-20
1-7/8	8-10-12-14- 16-18-20-24
1-15/16	8-10-12-14- 16-18-20-24-28
2	4 1/2-8-10- 12-16-18-20
2-1/16	12-14
2-1/8	12-16-20
2-3/16	12-16

SIZE	THREAD
2-1/4	4 1/2-8-12- 14-16-18
2-5/16	12-18
2-3/8	12-16-18
2-1/2	8-10-12
2-9/16	18
2-5/8	12-16-20
2-3/4	16
2-7/8	8-12-18
3	8-16
3-1/4	8-12-18
3-1/2	8-12-18
3-7/8	8
4	8-12

HIGH SPEED LEFT HAND TAPS

SIZE	THREAD
0	80
1	56-64-72
2	56-64
3	56
4	32-36-40-48
5	40-44
6	32-36-40
8	32-36-40
10	24-30-32-40
12	24-28-32
1/4	20-28-32
5/16	18-20-24
	20-32
3/8	18-24-32
7/16	14-20-28
1/2	12-13-20-28
9/16	12-18-20-24
5/8	11-12-16- 20-24

SIZE	THREAD
11/16	11-16-24
3/4	10-16-18-20
13/16	16
7/8	9-12-14-18-20
1	8-12-14-16-18-20
1-1/8	7-12
1-1/4	7-12-16-18
1-3/8	6-8-10-12-16-18- 20-24
1-7/16	8-10-12-14-16-18-20
1-1/2	8-6-10-12-16-18-20
1-5/16	8-10-12-16-18-20
1-5/8	8-10-12-14-16-18-20
1-11/16	8-10-12-14-16-18-20
1-3/4	8-10-12-14-16-18-20
1-7/16	8-10-12-14-16-18-20
1-15/16	8-10-12-14-16-18-20
2	4 1/2-10-12

LEFT HAND AND SPECIAL DIES IN STOCK

PRICES ON APPLICATION. NEW SIZES
ADDED FREQUENTLY

NOTE: Oversize — Undersize — and ACME Taps available.
H. S. Extension drills—Special Reamers and Special
Milling Cutters, etc.

WRITE FOR SIZES AND PRICES

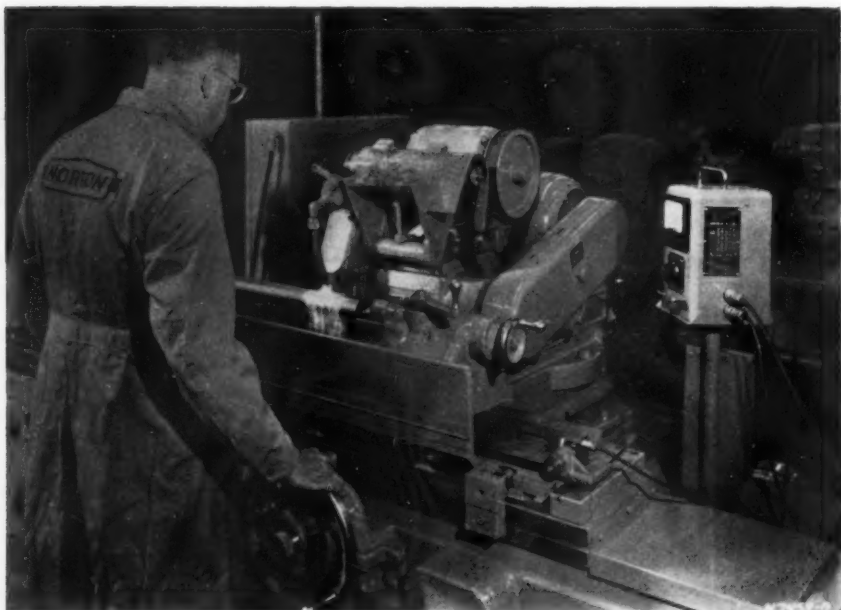
We will allow you full credit on your surplus and obsolete
tools. Write for particulars

SPECIAL PRICES TO DEALERS

WESTERN TOOL SUPPLY COMPANY

617-19 W. Randolph St., Chicago 6, Ill. PHONE: RAndolph 5-4113

**SPECIAL PRICES ON
REGULAR TOOLS.
Send for Catalog.**



DRILL THESE HOLES
 BY A QUICK, EASY INEXPENSIVE METHOD
 Your business letterhead will bring literature
WATTS BROS. TOOL WORKS
 Wilmerding, Pa.

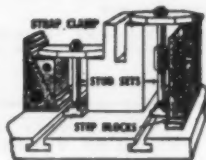
Circle No. 442 on Card, Opposite Page 65

foot and the other .0005" per foot of taper change are provided. The desired range is obtained by a selector switch on the front of the instrument case.

Use ACTION Card, opposite page 64, Circle No. 118

Adjustable diameter linear bearing

Ball bearings for linear motion, adjustable diameter ball bushings, are split longitudinally as illustrated and provide line-to-line or slight preload



SURE GRIP STOP BLOCKS

Clamping tools of all types

Write for free tracing templates

TIETZMANN TOOL CORP.

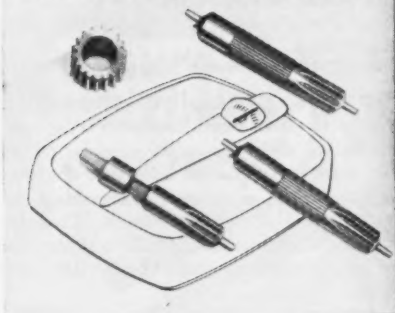
Dept. C. T.

Englewood, Ohio

Circle No. 443 on Card, Opposite Page 65

20 TO 200 D.P.

SEND YOUR PRINTS FOR QUOTATION



SPURS • HELICALS • WORM AND WORM GEARS
STRAIGHT BEVELS • LEAD SCREWS • RATCHETS
CLUSTER GEARS • RACKS • INTERNALS • ODD SHAPES

THE *Finest* IN GEARS

Beaver Gear Works Inc.

1033 PARMELE ST. ROCKFORD, ILLINOIS

Circle No. 444 on Card, Opposite Page 65

NIELSEN Heavy Duty

*Live
Centers*

Write for
catalog on
live centers

Adapted
for heavy
duty work.
Precision type
ball and roller
bearings assure
maximum capac-
ity for high speed
production and long
service.

NIELSEN, INC. LAWTON,
MICH.

Circle No. 443 on Card, Opposite Page 65

October, 1956

Now! PRECISION EXPANDING MANDRELS by **CHAMPION**

PRECISION
MODEL

STANDARD
MODEL



The expanding sleeve, mounted on tapered arbor, expands automatically to fit the hole. Inserted by hand—no arbor press needed. Always an exact, positive, concentric fit. Locked by a single mallet blow. Unlocked the same way. CHAMPION Expanding Mandrels are used in machine shops around the world. Save time, cut production costs, whether the job calls for machining one piece or a thousand.

Precision Model has expansion range of .010". Available in regular sizes to fit holes from 1/2" to 9 1/2" diameter. Holds work to tolerances of .0002" run-out. Guaranteed for precision grinding, turning and milling operations.

Standard Model maintains close tolerances, handles materials of any length bore, hard or soft metals—from thin tubes and bushings to heavy castings and forgings. A set of fourteen will fit every hole from 1/2" to 9 1/2" diameter.

CHAMPION Expanding Mandrels can be made in special shapes and sizes to fit any specifications. Quotations on request. Write for descriptive folder today.

Certain areas are available for qualified distributors.

**PATTON
MFG. CO., INC.**

Springfield
OHIO

Circle No. 446 on Card, Opposite Page 65



fits when mounted in an adjustable diameter housing.

Bearings enable the tolerance on both the shaft diameter and bearing bore to be adjusted out. The principle also provides for compensation for wear that might develop in severe applications.

The bearings are frequently used in a housing that is merely split and pro-

vided with an adjusting screw. They are available in standard sizes for shaft diameters ranging from one inch to four inches. Thomson Industries, Inc., Manhasset, N.Y.

Use ACTION Card, opposite page 64. Circle No. 118

Speeds precision checking

The angle of deviation from true horizontal or vertical can be quickly proved on most movable or mounted fixtures by means of a precision checking device called the Magnacheck. This instrument claims fast, positive inspection of angle plates, angle bars, dies and tools.

Inspection and checking can be done in any position, including horizontal. Device is made of stainless steel and has a powerful permanent type magnetic base, eliminating the necessity for clamping it in position. Magna-Lock, Inc., 268 Maple St., Big Rapids, Mich.

Use ACTION Card, opposite page 64. Circle No. 119

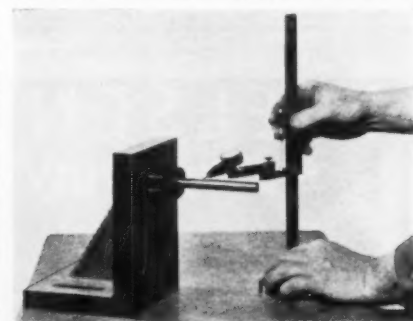


Powered by the press ram... independent of the die

1. **CHOPS** steel up to 3" wide, $\frac{1}{4}$ " thick.
2. **FITS** any punch press . . . easy to install.
3. **CUTS DOWNTIME** . . . high speed steel blades installed in a moment.
4. **SAVES HANDLING SCRAP** . . . scrap falls into collection barrel.
5. **SAVES MONEY** . . . low purchase price, no operating cost.

Write today for full details
JACO DEVICES, INC.
 99 High Street
 HINGHAM, MASS

Circle No. 447 on Card, Opposite Page 65



DANNEMAN Precision DIE-SETS

Precision-Bored on Master Plates



DANNEMAN DIE-SET DIVISION
 ACME-DANNEMAN COMPANY, Inc.
 201 Lafayette St. New York 12, N. Y.

CATALOG ON REQUEST

Circle No. 448 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

ROOFE LIVE CENTERS

**assure
maximum
accuracy!**

Users everywhere praise ROOFE Live Centers for increasing production, lowering costs, and for giving maximum accuracy.

Made of the finest alloy steels, standard types are available in Morse Taper, Brown & Sharpe, Jarno, straight or special shanks, to your specifications. Write for catalog.

Reliable distributors wanted.

HOUSTON GRINDING & MFG. CO., Inc.

P. O. BOX 7261

• HOUSTON 8, TEXAS

Circle No. 449 on Card, Opposite Page 65



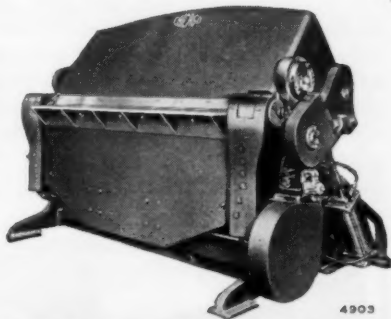
STEEL HAND and POWER

BENDING BRAKES

for Single and Quantity Runs

**BENDING STEEL PLATE
and SHEET METAL**

Special Bending Brakes
Double Folder Brakes



4903

DREIS & KRUMP

MANUFACTURING COMPANY

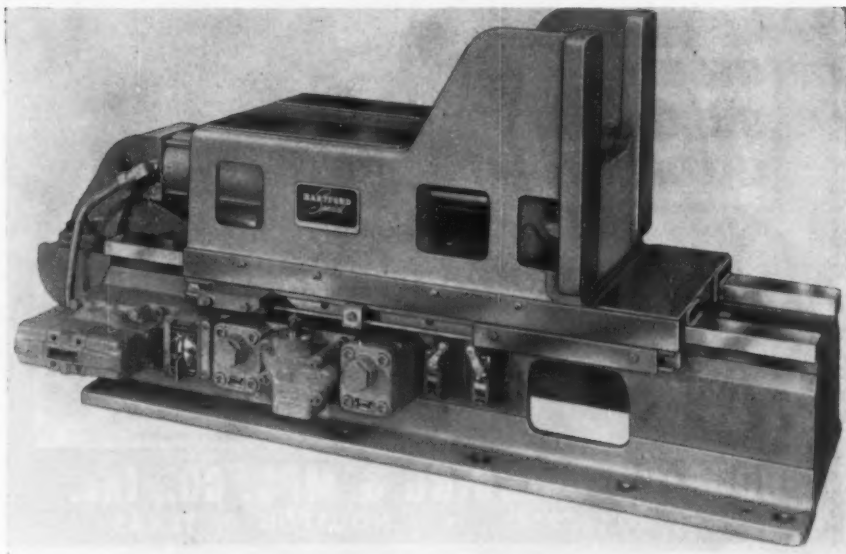
7440 S. Loomis Boulevard, Chicago 36, Illinois

CHICAGO

STEEL BENDING BRAKES
BOX and PAN BRAKES
PRESS BRAKES

Circle No. 450 on Card, Opposite Page 65

Way Type Hydraulic Feed Unit



The Model 405 way type hydraulic feed unit features thrust above the ways near the tool load. It provides positive control of rapid traverse, fine feed and depth. The flange is designed to simplify mounting and aligning of multiple spindle heads, and the 15" stroke gives ample tool change clearance. The Hartford Special Machinery Co., Dept. MG, Hartford 12, Conn.

Use ACTION Card, opposite page 64. Circle No. 120

"KNOWN AS THE BEST" GEM VISES

Their "Versatility" and "Quick-Action", without use of cumbersome wrenches, will soon repay their cost in time-savings, safety and convenience.



Complete range of sizes for all Machines. Plain, Swivel & Tilting. Write for complete information.

J. E. MARTIN MACHINE CO.
548 W. STATE SPRINGFIELD, OHIO

Circle No. 451 on Card, Opposite Page 65

Our Large, planned stocks of



Punches & Dies

mean savings for you.

For years we have been following a systematic plan of increasing our stocks of standard punches and dies that benefits you two ways:

- (1) The punches and dies you need are **READY** and waiting **WHEN YOU NEED THEM**.
- (2) Because standards are made in large quantities, **PRICES ARE SURPRISINGLY LOW**—quality of the highest.

68 years of experience goes into every Lewthwaite tool!—and it shows!

CATALOG SHEETS ON REQUEST.

312 East 47th St., New York 17, N.Y.

T. H. LEWTHWAITE MACHINE CO.

Circle No. 452 on Card, Opposite Page 65



WESPO *for ALL*

WORK-HOLDING NEEDS

TOGGLE CLAMPS

39 TYPES AND SIZES

NOTE These Features: Reamed holes—hardened serrated bushings—high tensile strength rivets.

STANDARD FIXTURE CLAMPS

16 STYLES - 136 SIZES

OVER 1000 COMPONENTS

TYPES AND SIZES

Write for Template Catalog

WEST POINT MFG. CO.



26931 West 7 Mile Road

Detroit 19, Mich.

Circle No. 453 on Card, Opposite Page 65

BLUE VALLEY FLANGING MACHINES

No. 1 10 gauge capacity combination circle shear and flanger; from 14" to 6" diameter flat with support; 12" diameter less support.

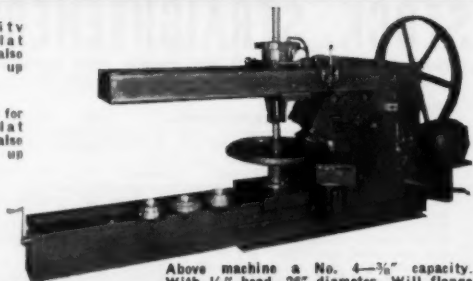
No. 3 1/4" capacity flanging flat heads from 18" to 12".

No. 4 3/8" capacity flanging flat heads 20" to 12"; also handles standard, dished heads up to 12" dia.

No. 53 Elliptical Head Shear and Flanging Machine which operates from the same controls. Head is sheared to size and shape before flanging from same template without removing work from the machine.

No. 5 1/2" capacity flanging flat heads 24" to 20"; also handles dished heads up to 12" dia.

No. 6 3/4" capacity for flanging flat heads 28" to 20"; also handles dished heads up to 12" dia.



Above machine a No. 4—3/8" capacity. With 1/4" head, 20" diameter. Will flange flat heads from 20" to 12 ft. in all thicknesses up to and including 3/4" boiler plate. Dished head attachments can be furnished with this model.

BLUE VALLEY

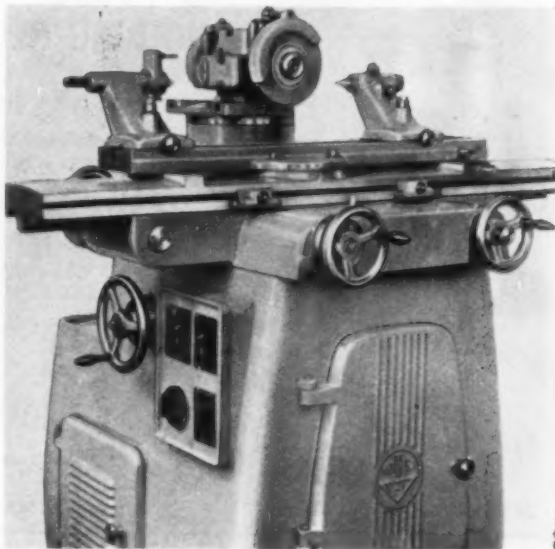
MACHINE & MFG. CO.

6832 Truman Road KANSAS CITY 26, MO.

Circle No. 454 on Card, Opposite Page 65

Universal Tool and Cutter Grinder Has 19,000 RPM Internal Grinding Spindle

The Pedersen universal tool and cutter grinder Model USL features: table size $36\frac{1}{4} \times 5\frac{1}{2}$; main spindle rated at 3800 to 5750 rpm; fine internal grinding spindle rated at 19,000 rpm maximum; telescoping metal-enclosed spindle column; special table and saddle bearing arrangement which insures smooth and free movement of table; universal accessories including an "all angle plate" for compound grinding and for large cutter heads, optional. Aaron Machinery Co., Inc., 45 Crosby St., New York 12, N.Y.



Use ACTION Card, opposite page 64, Circle No. 121

HOW TO STOP HEADACHES IN THE PRESS ROOM AND

SAVE AT LEAST 10% ON HAND FED JOBS BY USING COIL INSTEAD OF STRIP MATERIAL

STOCK STRAIGHTENERS

ORDER DIRECT on our 10 day money back guarantee
The ONLY low cost stock straightener with all these features:

CAPACITIES—
2" wide; .010 to .065 in steel, to .093 in soft material.
4" wide; .010 to .048 in steel, to .065 in soft material.

MACHINE DETAILS

1. Built in Stock Oiler with easily replaceable felts, this cleans and oils the material in one operation.
2. Has seven hardened and ground rollers, five for straightening and two for feeding.
3. All lower straightening rollers and the feed rollers are gear driven, thus cuts feeding pressure and protects preprinted and preprinted materials.
4. PULS material through the straightening rollers. WILL NOT BUCKLE THIN MATERIAL, has been used on Inconel, Stainless Steel, Platinum, Phosphor Bronze, and Beryllium Copper.
5. The pressure rollers have adjustable stops, this can save thirty to sixty minutes a day.
6. Has Ball-Bearing Guides at front and back.
7. All gears and moving parts are protected by guards to keep dirt and fingers out.

CAN BE SUPPLIED IN MANY MODELS, motor drive, etc., write for information.



SPERMAN METAL SPECIALTIES

Manufacturer of "MIGHTY MIDGET" Radius and Angle Dressers

2197 East 21st Street
Brooklyn 29, New York

Circle No. 455 on Card, Opposite Page 65

Four Station Bore-Matic



With one machine operator, this Model S Bore-Matic borizes 240 refrigerator parts per hour. Borizing operations done on the cast iron workpiece are: turn o.d., face rim, and chamfer.

Four hydraulically powered slide units are mounted on scraped base pads,

each slide unit carrying two boring-heads and a single motor drive arrangement. Hydraulic pressure is supplied to the slides by a 30 gallon per minute hydraulic power unit mounted at the rear of the machine. Rotating air-operated, centrifugally damped, work-



DYKEM STEEL BLUE[®]

Stops Losses

making Dies and
Templates

Popular package
8-oz. can fitted
with Bakelite cap
holding soft-hair
brush for applying right
at bench; metal surface
ready for layout in a few min-
utes. The dark blue background
makes the scribed lines show up in
sharp relief, prevents metal glare.
Increases efficiency and accuracy.



With DYKEM Steel Blue

Without DYKEM Steel Blue

Write for sample on company letterhead
THE DYKEM COMPANY
 2301G North 11th St. • St. Louis 6, Mo.

Circle No. 456 on Card, Opposite Page 65

holding chucks mounted on the boring-head are interchangeable to accommodate different size parts.

Each of the four work stations is independently operated, two parts being machined simultaneously at each station. Air operated fixture clamping is done by foot peddle and the cycle is controlled by push buttons at each station.

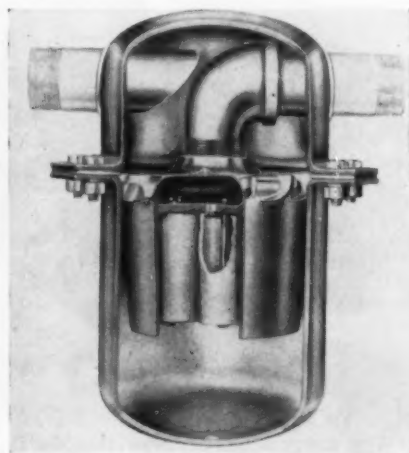
An automatic chip conveyor mechanism is mounted in the base cavity.

The Heald Machine Co., Dept. JP, Worcester 6, Mass.

Use ACTION Card, opposite page 64. Circle No. 122

High flow filter

The Model 3116—2" high-flow industrial filter was designed for bulk handling of liquids, gases, diesel fuel, hydraulic fluids, gasoline, water, chemicals, oils, distillates and compressible fluids. It provides efficient filtration with low-pressure drop.

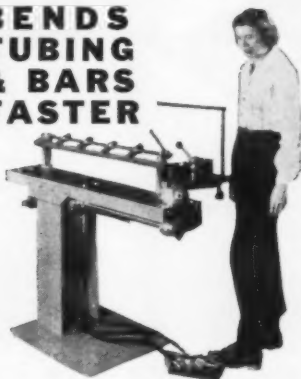


The permanent porous bronze, cleanable filter element filters out solids from 80 microns down to 6.5 microns. Arrow Tools, Inc., Dept. MM, 1937 S. Kostner Ave., Chicago 23, Ill.

Use ACTION Card, opposite page 64. Circle No. 161

CURVIT 105

**BENDS
TUBING
& BARS
FASTER**



500 BENDS AN HOUR

\$1,600 COMPLETE.

FOUR STOPS.

**BEST BUY FOR $\frac{5}{8}$ "
AND $\frac{3}{4}$ " STEEL
TUBING.**

**KILHAM
ENGINEERING INC.
R.F.D. North Attleboro, Mass.
MYrtle 5-6211**

CURVIT 105

Circle No. 437 on Card, Opposite Page 65

HAND KNOBS



6 Sizes Cast-Iron

Tapped, Reamed
or Blank

Hex-shaped hub for
extra tightening

Write for catalog

**TIETZMANN TOOL CORPORATION
DEPT. H-K ENGLEWOOD, OHIO**

Circle No. 458 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

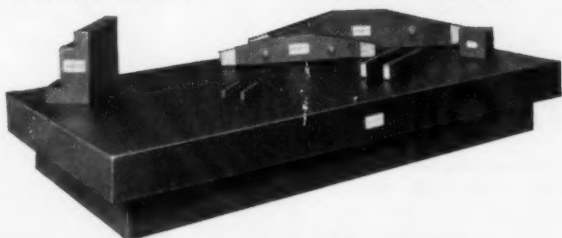
COLLINS

MICROFLAT[®]

**BLACK
GRANITE**

- SURFACE PLATES
- ANGLE PLATES
- STRAIGHT EDGES
- LAYOUT PLATES
- PARALLELS
- T-SLOTTED PLATES

COLLINS MICROFLAT
surface plates and
precision accessories
offer the user
life-time accuracy
at a minimum cost
All sizes —
Write for bulletins.



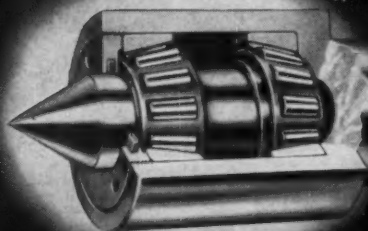
COLLINS MICROFLAT COMPANY, INC.

2326 East 8th Street • Los Angeles 21, California

Circle No. 459 on Card, Opposite Page 65

... precision performance—ALWAYS!

Falls ROTO CENTER



for
lathe and grinder
tail stocks



Accurate, low cost turning
on tough continuous-run
work. Preloaded, matched
roller bearings assure
rigid set-up. Precision
ground shank. Heavy-
duty grease seal. Many
exclusive features.

FREE BULLETIN 105

"What you should know
about LIVE CENTERS"

FALLS PRODUCTS, INC., 122 Genoa Street, GENOA, ILL., U.S.A.

Circle No. 460 on Card, Opposite Page 65

Small but Rugged Surface Grinder

The size, 6"x18"x12", of the Abrasive 618 precision surface grinder is in keeping with today's demand for a small, yet rugged, precision surface grinder that's easy to operate and maintain. To provide control, new roller-bearing ways, a back-lash eliminator on the saddle feed and a table cable and drum drive have been incorporated.

All controls are on the same waist-high plane; hand wheels are recessed for comfort. The saddle is a special close-grain, stress-relieved casting. Full 5" of saddle box construction prevents distortion or warping even at 50% overload. The spindle is of wide diameter cartridge design and is totally enclosed, dynamically balanced and life-time lubricated. The machine is equipped with either a 12" grinding wheel powered by a 2 hp 1750 rpm motor or a 7" grinding wheel with a 1 hp 3450 rpm motor. Abrasive Machine Tool Co., Dexter Rd., East Providence 14, R.I.

Use ACTION Card, opposite page 64. Circle No. 123



Bench arbor press

A 10 ton capacity bench arbor press, Model 137-BH, performs various operations, including blending; straightening; marking; punching; removing and replacing gears, bearings, and bushings

A Simple Formula for Solving Tooling Problems

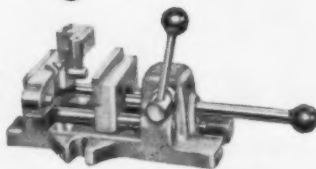
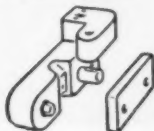
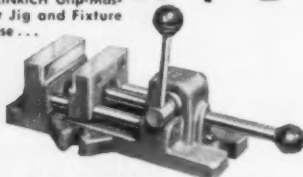
No need to start from scratch... use the HEINRICH Grip-Master Jig and Fixture base...

A + B

Simply add false jaws and bushing plate.

= C

Result... an accurate, low-cost Drill Jig.



HEINRICH TOOLS, Inc. Dept. 106-K Racine, Wis.

Circle No. 461 on Card, Opposite Page 65

LONGER TOOL LIFE—CLEANER FINISH

When
You Add **LUBIKOLD**
Anti-Friction Compound
(in white powder form)

Excellent for cooling hot bearings, die-sets, pillars, slides, ways, & posts. Just add Lubikold to your present lubricating oil or grease. Lubikold reduces friction drag and saves wear on moving metal parts. Won't break down in any heat.



Packed in 5-10-25 & 50 lb. containers.

Added to cutting oils, soluble oil, or any coolant, Lubikold will increase production tremendously, giving you far longer tool life and cleaner finish.

Wonderful results obtained in tapping, threading, drilling, milling, stamping, forming, punching, drawing, die-casting and etc.

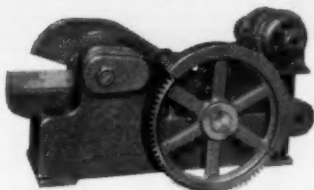
For Plaster Molding-Mix Lubikold with your present plaster separator for better parting qualities and better mold surface. The separating lubricant highly recommended by the U.S. Gypsum Co.

For free sample, literature, write to us on your letterhead today. No obligation.

LUBIKOLD CO. 516 Bergen St.
Brooklyn 17, New York

Circle No. 462 on Card, Opposite Page 65

Beloit



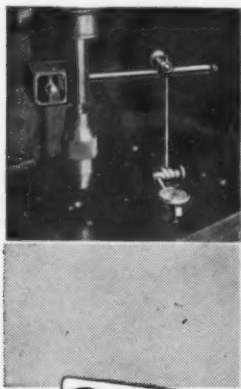
ALLIGATOR SHEARS

These are high speed shears designed for heavy duty. Frames, levers and eccentric shafts are solid steel castings. Can be furnished with gear keyed to eccentric shaft for continuous operation, or mounted on legs with foot operated clutch shifter. WRITE FOR COMPLETE DETAILS.

Buy
Beloit

HENDLEY & WHITEMORE CO.
100 BLACKHAWK BLVD. • BELOIT, WIS.

Circle No. 463 on Card, Opposite Page 65



push—it's on



push—it's off

the "original"
dial indicator holder
with
push button control

Precision built to hold securely the best dial indicators.

Eclipse

MAGNETIC BASE

For descriptive literature and address of sales agent in your area, write to

JAMES NEILL & CO. (U.S.A.) LTD.
37/39 PEARL STREET, NEW YORK 4.

Circle No. 464 on Card, Opposite Page 65

PM 20

**LIVE CENTER
ACTION WITH
DEAD CENTER
ACCURACY**

USE



**ANTI-SCORING
LUBRICANTS**

**PROVE IT TO
YOURSELF IN
YOUR OWN PLANT FOR ONE
DOLLAR AND THIS COUPON!**

Free-running on dead centers—with COMPLETE protection. CMD Lubricants are CONCENTRATED, form a "tough" film—absolutely NO GALLING or SEIZING—under the heaviest load. STABILIZED for added "oiliness" giving longer, smoother runs without slip-stick action. It all adds up to LIVE CENTER ACTION with DEAD CENTER PRECISION. The bigger the job, the better you'll like it.



**TRIAL ORDER—
TWO FOUR OZ. TUBES \$1.00**

Send me my order of CMD right away!

Bill me ☐ Bill my company ☐

Name

Company Name

Address

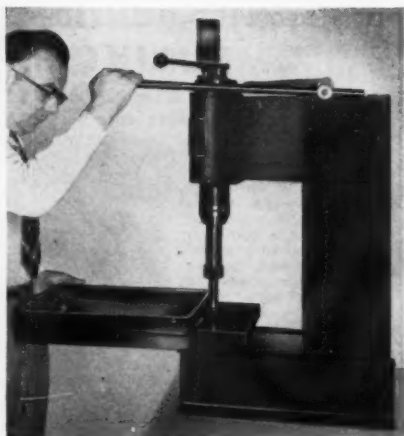
City State

Chicago Manufacturing and Distributing Co.

1906 West 46th St., Chicago 9, Illinois

**CHICAGO MANUFACTURING
AND DISTRIBUTING CO.**

Circle No. 465 on Card, Opposite Page 65

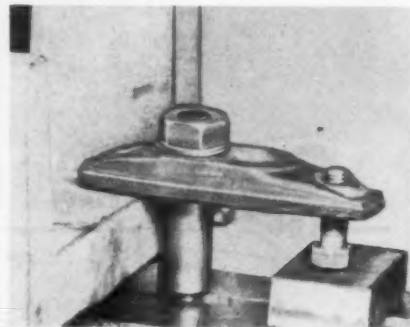


on motor shafts and other equipment. The press features a release valve for finger tip ram control and completely self-contained hydraulic cylinder. Specifications: 6¾" hydraulic stroke and 12" maximum daylight opening. K. R. Wilson Inc., Dept. RH, Arcade, N. Y.

Use ACTION Card, opposite page 64. Circle No. 124

Hold down clamp

The Jergens QK hold down clamp has a telescoping feature that adjusts up and down to fit a wide range of work without the necessity of using a large variety of T-bolt lengths for the varying work heights. One end of the clamp is



Abart IMPROVES EQUIPMENT PERFORMANCE

SPEED REDUCERS

Over 75 types and sizes for all applications. Ratings from 1/50 to 417 hp. Ratios from 2-1 to 10,000-1.



GEARS

Precision cut to your specs from any material. 5/7 to 96 D.P.—Spur, Helical, Worm, Bevel and Spiral Bevel. 1/4" to 18" P.D.



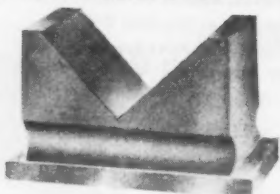
Get full data in Abart's pocket-size catalog. Your copy of this helpful, technical handbook FREE on request.

ABART GEAR & MACHINE CO.

4829 West 16th Street • Chicago 50, Illinois

Circle No. 466 on Card, Opposite Page 65

SEMI-PRECISION "V" BLOCKS FOR ALL-AROUND SHOP USE



STOCK NO.	BASE	CAPACITY	NET PRICE EA.
10	4 1/2" x 3"	2 3/4" dia.	\$ 8.00
11	6 1/2" x 4"	4 3/4" dia.	16.25

Sturdily designed for hard usage . . . Ideal for drill presses, milling machines, shapers and planers. Will test round shafting for straightness . . . Economically priced.

WRITE FOR DESCRIPTIVE BULLETIN

ACME TOOL COMPANY

71 West Broadway New York 7, N. Y.

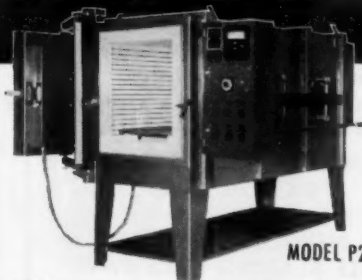
Circle No. 467 on Card, Opposite Page 65

dyna-trol

ELECTRIC FURNACES

MODEL NO.	FIRING CHAMBER (H.W.D.)	PRICE (300" to 2000")	PRICE (400" to 2300")
P46	4 1/2" x 4 1/2" x 6"	\$90.00	\$110.00
P79	6" x 6" x 9"	\$205.00	\$225.00
P918	9" x 9" x 18"	\$480.00	\$528.00
P414	14" x 14" x 14"	\$525.00	\$603.25
P124	12" x 12" x 24"	\$715.00	\$822.25
P818	18" x 18" x 18"	\$775.00	\$887.50
P136	18" x 18" x 36"	\$1125.00	\$1312.50

Automatic Controls Available on all Models



MODEL P2472-1

- Infinite zone temperature control.
- Zone temperature indication by Pyrometer Selector Switch.
- Automatic hold and cut-off instrument available.
- Patented element holders.
- Infinite variety of time-temperature curves obtainable.
- Rugged construction. Highest quality insulation used.

OVER 40 STANDARD MODELS • WRITE FOR LITERATURE

L & L

INDUSTRIAL DIVISION MANUFACTURING CO.

CHESTER 68, PA.



MODEL P-79

DO YOU MAKE?

- Plastic, Rubber or Glass Molds
- Forging or Die Cast Dies
- Contoured Parts for Ordnance or Aircraft



**YOU CAN SAVE
UP TO 60%**

Now 2 Major Improvements
on the Fluid Motion

REGENT DUPLICATOR

NEW . . . ADJUSTABLE
FRICTION BRAKE

For Selective Table Sensitivity

NEW . . . CIRCULAR
BALL BEARING RACEWAYS

For Even Smoother Table Movement

**MOUNTS IN MINUTES ON YOUR
BRIDGEPORT AND CINCINNATI
TOOLMASTER MILLS**

Capacity 6" x 6" — 1 to 1 ratio with
master. 2 or 3 dimensional with great-
est accuracy. Single lever table con-
trol. Table "floats" on precision balls.

For literature write to

J. M. KALINS & CO.

1575 Railroad Ave., Bridgeport, Conn.

REGENT

of conventional design, the other end is a special design to fit into small slots and recesses. Full thread engagement is maintained by the stopping action of a snap-ring on the end of the T-bolt. Threaded holes in both ends permit leveling of either end.

Clamps are available in six sizes, with the smallest telescoping from 9/16" to 27/16" and the largest from 2 3/4" to 5 3/4". Jergens Tool Specialty Co., Dept. RH, 712 E. 163rd St., Cleveland, O.

Use ACTION Card, opposite page 64. Circle No. 125

Improved belt grinder

Four improved models of the Delta 2 1/2" belt grinder feature new rubber contact wheels and improved belt align-



ment adjustment. The standard back stand idler units permit lateral adjustment of the drum.

New models are being shipped to dealers as an assembled unit for the first time. Delta Power Tool Div., Rockwell Mfg. Co., 446 N. Lexington Ave., Pittsburgh 8, Pa.

Use ACTION Card, opposite page 64. Circle No. 126

Circle No. 469 on Card, Opposite Page 65



The fastest known method of increasing production!

Model 500 Contact Wheel Belt Grinder offers maximum operator comfort due to unique 360° rotating adjustment. Removes metal faster than any other known method. Write for new illustrated booklet. *B & E Mfg. Co., Inc., 2104 E.31 St., Kansas City, Mo.*

Circle No. 470 on Card, Opposite Page 65

SPECIFY

STANDARD



WOODRUFF KEYS

ALSO FOR

- TAPER PINS
- MACHINE KEYS
- MACHINE RACKS

STANDARD WOODRUFF KEYS are **STANDARD** in many plants including the large automotive manufacturers. Why? Because **STANDARD KEYS** are precision made and tested before shipment. Available in all standard sizes for prompt shipment. Sizes range from $\frac{1}{8}$ x $1\frac{1}{16}$ to $3\frac{1}{2}$ x $\frac{3}{4}$. Specify **STANDARD Woodruff Keys** and other **STANDARD** products.

WRITE TODAY FOR CATALOG

STANDARD STEEL SPECIALTY CO.

BEAVER FALLS • PENNSYLVANIA

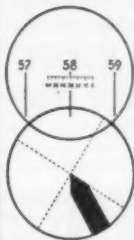
Plants: Beaver Falls, Pa.; Hammond, Ind.

Circle No. 471 on Card, Opposite Page 65

new SCHERR TOOLMAKERS MICROSCOPE



**WITH INTERCHANGEABLE
DIAL TEMPLATES AND OCULARS**



Reading Angles in Minutes

Thread Templets
for U. S. National
Thread Profiles-
6-80 Pitch.
Radii Templets, etc.



**LARGE MICROMETER DRUMS
READ DIRECTLY IN .0001"**

Measuring Range 2" x 1-1/2" and other sizes

**A moderately priced PRECISION
MEASURING TOOL for Toolroom and Inspection**

WRITE FOR CATALOG—Code YGIIQ

Geo. SCHERR OPTICAL TOOLS, Inc.

200-MT. LAFAYETTE STREET • NEW YORK 12, N. Y.



Circle No. 472 on Card, Opposite Page 65

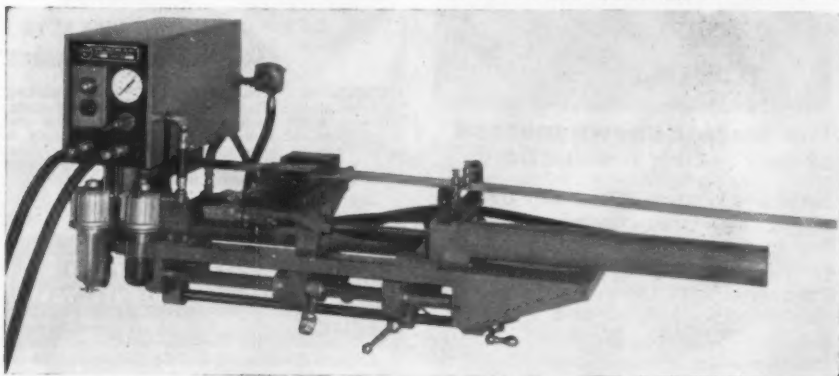
Press Feed Improved

Rated speed of carriage has been increased from one foot per second maximum to one and a half feet per second at 100 psi on an improved Micro-Air power press feed. Controls are centrally located.

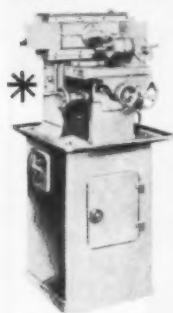
Spring loaded grease cups on longer

bushings give smoother performance. Lead screw permits adjustment of feed length while machine is in operation. Nadel Tool & Mfg. Co., Inc., Dept. MG, 20 Warren St., New York 7.

Use ACTION Card, opposite page 64. Circle No. 127



FORM and PUNCH SHAPER



ECONOMICAL PUNCHES
with CURVED NECKS
finished completely IN
ONE CHUCKING

with the
JEMCO
K-150
punch shaper

sample
punches

1 hr.

1.5 hrs.

2 hrs.

1.5 hrs.

1.5 hrs.

4 hrs.

3.5 hrs.

- finish job in one chucking
- 30 power built-in microscope for high precision — close tolerances

EXCLUSIVE TERRITORIES OPEN
write for complete information to . . .



Jersey manufacturing co.
401-A LIVINGSTON ST. • ELIZABETH, N. J.

Circle No. 473 on Card, Opposite Page 65

JIG BORING

and

Large Precision Machining
Done to your specifications

WE HAVE 21 JIG BORERS

KIDDE PRECISION TOOL CORP.

25 LOCUST AVE.

ROSELAND, N.J.

Circle No. 474 on Card, Opposite Page 65

CAM MILLING

Fully equipped modern machine shop with extensive **Jig Boring, Surface Grinding, Horizontal Boring** and **Thread Grinding** facilities as well as modern **Cam Milling** and **Cam Grinding** equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC.
23-21 44th Road Long Island City 1, N. Y.

Circle No. 475 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

INCREASE PRODUCTION...



Above is shown a 6M Fen Automatic Wrench operating a 28" heavy duty chuck.

ELIMINATE "WRENCH WRESTLING"

You can put the advantages of the Fen Automatic Wrenches to your work right in your own shop on machines already in operation, or specify them on your new standard or automatic machines.

• • •
For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

**THE FEN
MACHINE COMPANY**
28914 Lakeland Blvd.
Wickliffe, Ohio

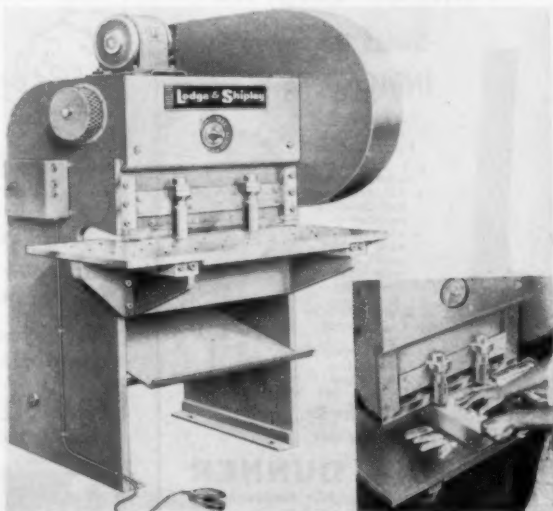
Circle No. 476 on Card, Opposite Page 65

24" Speed Shear

This 24" production shear has a blade length of 24", a throat 7½" deep and capacity up to ⅝" in mild steel. It operates at speeds up to 120 strokes per minute and is compact: 72" high, 50" wide and deep.

The machine will do straight and angle shearing, sequence shearing, slitting, notching, blanking and duplication of straight-side parts without dies.

The table extends around the left end of the blade for convenience in notching and slitting. The entire table is provided with tapped holes for quick, accurate setup of pro-



tractors, clamps and cutting guides. Ca-

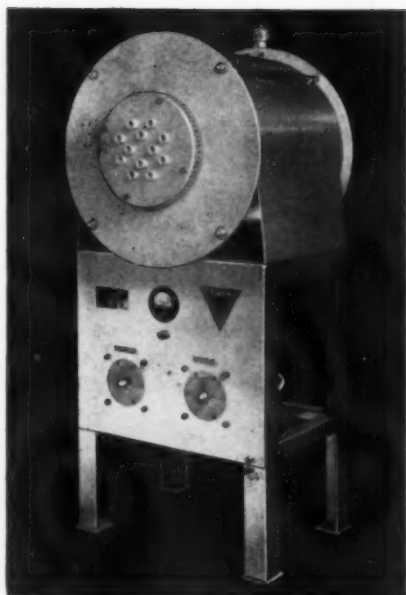
capacities include: $\frac{1}{8}$ " mild steel, $\frac{3}{32}$ " stainless steel, $\frac{7}{32}$ " duraluminum. Ledge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, O.

Use ACTION Card, opposite page 64. Circle No. 128

Electric furnace

This multi-tube high temperature electric furnace has been designed to meet situations where comparatively large quantities of small parts must be sintered under identically controlled conditions. Though initially developed to meet special requirements in the sintering (to a temperature of 2750° F) of ferrites of small dimension, it is also adaptable to many other ceramic and metallurgical processes.

The unit incorporates twelve alumina tubes, each $\frac{7}{8}$ " inside diameter by 30" long. Eight silicon carbide type heating elements surround the inner bank of tubes. Insulation is of 9" super duty, lightweight type. Power required is 10 kw, 220/60/1 and power controls



PARVUS COMPAC

Swiss made INDICATORS

TWO TYPES Regular & Perpendicular

- 5 different models available
- All models are Ball Bearing mounted
- Interchangeable contact point, adjustable thru 180° reversible pressure
- No side play on contact point
- Unsurpassed repetitive accuracy



write for
folder

BOREL & DUNNER

19313 Farmington Road
Livonia, Michigan

ALL in ONE



TOOLHEAD

BORING
FACING
TURNING
GROOVING
UNDER-
CUTTING

SIX SIZES
AVAILABLE

All Have Power Feed
for Facing

Write today for
complete details.

CHANDLER TOOL CO.

Muncie, Indiana



Model "D"

COMBINED BORING & FACING TOOL HEADS
Chandler-Duplex

Circle No. 477 on Card, Opposite Page 65

Circle No. 478 on Card, Opposite Page 65

consist of voltage regulating transformer, fine and coarse switches, direct reading power input ammeter, and magnetic contactor. Pereny Equipment Co., Dept. JS, 893 Chambers Rd., Columbus 12, O.

Use ACTION Card, opposite page 64. Circle No. 129

V-block angle plate saves setup time

The Lassy master V-block angle plate is precisely square on all sides, thereby

creating savings in setup time with no sacrifice in accuracy.

Neither square nor surface plate is required to square work automatically—simply attach gage to either side of angle plate; leave angle plate in chuck.

An adjustable parallel, also attached to side of angle plate, holds the smallest work without the aid of parallels or blocks. The adjustable step clamp permits holding of very thin and nar-

Johnson METAL CUTTING BAND SAWS



Model B
(Wet or Dry Models)
Cuts 5" rounds, 10" flats

- for precision
- operating ease
- economy



Model J (heavy-duty)
(Wet or Dry Models)
Cuts 10" rounds, 18" flats

THE MODERN LOW COST WAY TO CUT METAL

Johnson Metal Cutting Band Saws are fast . . . tough . . . and completely automatic in operation. Yet they COST LESS than comparative models. They'll cut anything in your stock pile safely and accurately . . . tubes, rods, angles, heavy rounds, flats, and irregular shapes, too.



GET ALL THE FACTS
Send for a Johnson catalog. See how a Johnson Saw will speed your production.

Johnson MANUFACTURING CORPORATION
1012 Barnes St., Albion, Mich.

Circle No. 479 on Card, Opposite Page 65

row pieces. Job versatility is afforded through means of tapped holes, tee slot and bolt slot.

Angle plate is made of carburized machine steel, hardened and stabilized

between grinds. All tapped holes are 5/16". "V" capacity is 1/8" to 2 1/2". Made by the Lassy Tool Co., Dept. DR, Plainville, Conn.

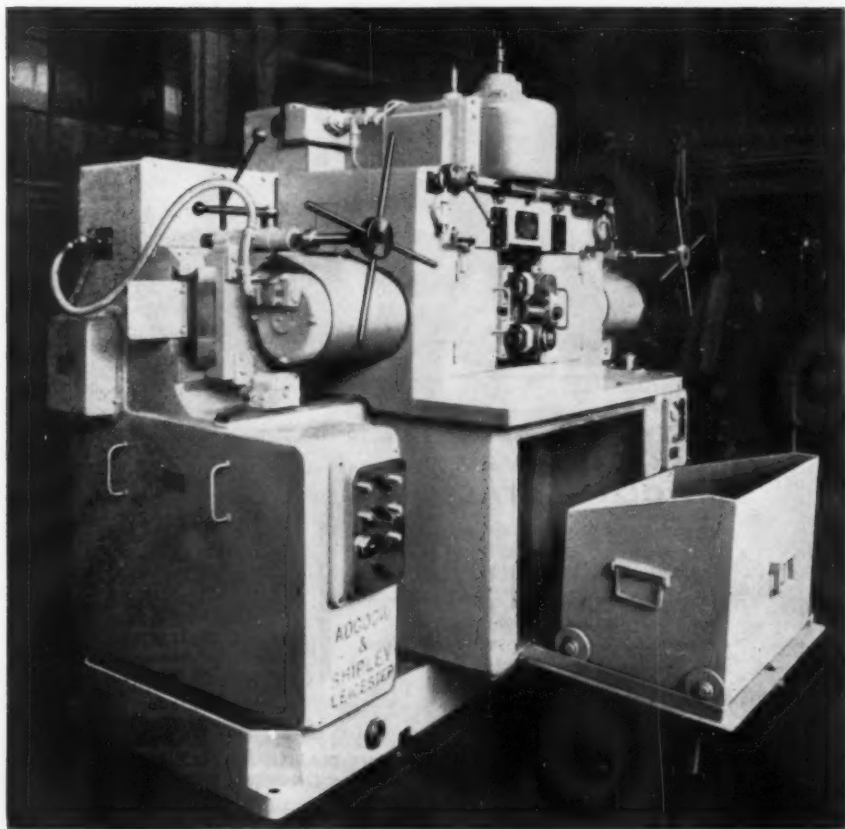
Use ACTION Card, opposite page 64. Circle No. 130

Gudgeon Pin Hole Drill

Adcock & Shipley, Leicester, England, have recently produced a machine for drilling the gudgeon pin holes in pistons for Humber Ltd., Coventry, England. The machine is of the horizontally opposed type with two multi-spindle heads and a two-station fixture enabling two components to be drilled at one station

while loading and unloading is carried out at the other.

Hydraulic power clamps and indexes the fixture. The indexing of the components in the fixture from the loading station to the drilling station and vice-versa is performed by means of opening the two doors on either side of the fix-



ture. The drill heads are automatically fed and stopped.

The close-up shows the outer stations of the fixture with the components in position and clamped.

The method of operation is as follows:

1. Unload and load two components at the front station.
2. The two levers at the left and right above the fixture are operated to:
 - a. Clamp the components in the

front station.

- b. Unlock the two doors.

3. Open the doors in sequence, first the right hand then the left, which causes the fixture to index through 180°, bringing the components to the drilling station.

4. Close the doors and operate the levers which then:

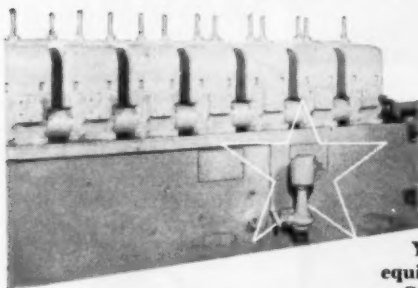
Lock the doors.

Unlock the clamp on the front



Ruthman Gusher Coolant Pumps

You get instantaneous coolant flow, from trickle to full volume, the moment the machine starts, with a Gusher Coolant Pump. The electronically balanced shaft reduces wear from vibration to a minimum. The pre-lubricated ball bearings require no maintenance attention. From every angle, Ruthman Gusher Coolant Pumps are better.



Illustrated is a
Yoder Forming Mill—
equipped with a Ruthman
Gusher Coolant Pump.

THE RUTHMAN MACHINERY CO.

1816 READING ROAD

CINCINNATI, OHIO

Circle No. 480 on Card, Opposite Page 65

station.

5. Start the drilling cycle by means of the push button.
6. Unload and reload as in 1.
7. Continue operations as in 2, etc.

The machine is fed hydraulically by a servo mechanism operated from cams rotated by a separate feed motor whose drive is equipped with pick-off gears to enable cycle times to be changed. Drill heads are mounted on slides on the

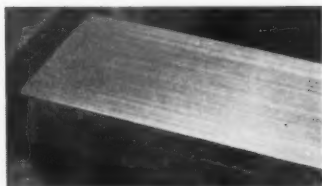
cabinet base. They are individually driven by 2 hp 1430 rpm motor stator units. Reamers of .854" diameter are fitted to standard collets each having individual adjustments of 1". The drill heads have a hand adjustment of 6 1/4".

Drilling is accomplished in a single stroke of the heads. U.S. distributor of this machine is Reynolds, Inc., 75 Baker St., Providence 5, R.I.

Use ACTION Card, opposite page 64. Circle No. 131

NEW, BETTER C/R way wiper

guards the life,
cuts downtime,
saves costly
maintenance on
machine tool ways



ABOVE, lathe way badly scored through inadequate protection; BELOW, C/R Wiper keeps mill way clear, smooth.



C/R Sirvene (synthetic rubber) Way Wipers will save you many times their cost by preventing scoring and abrasion of machine tool ways. Precision molded for extremely accurate fit, they will not trap harmful materials, but wipe ways clean of dirt, chips, fine abrasives and emulsions, leaving protective oil film. C/R Way Wipers are easily installed on flat ways, side rails, angles, columns and hydraulic rams. Write for detailed, illustrated brochure.



CHICAGO RAWHIDE MFG. CO.
1223 Elston Avenue Chicago 22, Illinois
IN CANADA: Manufactured and Distributed by
Super Oil Seal Mfg. Co., Ltd.,
Hamilton, Ontario.

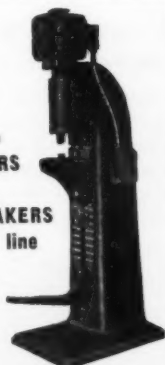
Circle No. 481 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

GRANT

RIVETERS . .

**PIONEERS
and
PACEMAKERS
in their line**



—head rivets from smallest to 3/4" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles

Write for literature and don't forget to send samples

THE GRANT MFG. & MACHINE CO.
CE Station, Bridgeport 5, Conn.

Circle No. 482 on Card, Opposite Page 65

KEO

**CENTER
REAMERS**

**•
HIGH SPEED
STEEL**

**•
3 FLUTES**



Cuts from 1/4" to 1". Furnished with 60, 82, 90, 100, 110 or 120 degree included angle. Large stocks on hand. Other angles are special. Let us quote.

Jobbers' Inquiries Invited

KEO CUTTERS

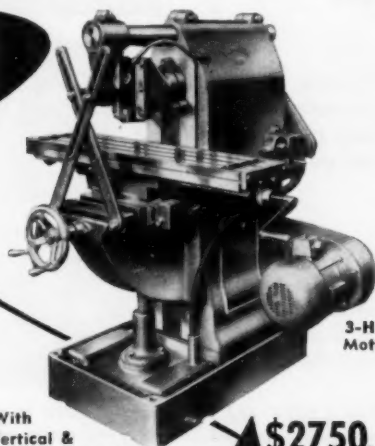
19326 Woodward - Detroit 3 Mich.

Circle No. 483 on Card, Opposite Page 65

The **Bradley**
MILLER
for **ECONOMY**

Looking for a well built miller, designed for long life and precision work at a low price? Look no further . . . as the Bradley Miller has all these qualities. Equipped with a vertical head and slotting attachment. Working table surface area is 46" x 10". Automatic feed longitudinal, 36 1/2". 10" vertical adjustment. Weighs 3,000 lbs. and occupies a 70" x 60" floor space. Further details mailed on request. Write today. No obligation.

Some Territories Open



**3-H.P.
Motor**

With
Vertical &
Slotting ATC Head

**➤ \$2750.
DELIVERED**

BRADLEY MACHINERY COMPANY

23440 Woodward Ave., Detroit 20, Mich.
Telephone Lincoln 7-3030

Circle No. 484 on Card, Opposite Page 65

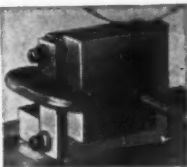
LASSY**MASTER
V-BLOCK****ANGLE PLATES****Proven Time Savers!**

A Master tool of versatility for every day use in . . . inspection and machining operations.

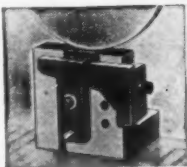
This Master V-Block Angle Plate is an improved new design. Saves hours of setup time. Assures precise work accuracy. Requires less skill.



Side Gage automatically squares work precisely and without removing angle plate from chuck. Repetitive accuracy maintained.



Adjustable parallel holds the smallest work for position and clamping with ease and accuracy.



LASSY MASTER Angle Plate also provides a master setup for regrinding of worn or inaccurate Angle Plates.



The LASSY MASTER Angle Plate is an indispensable tool precisely accurate and dependable.

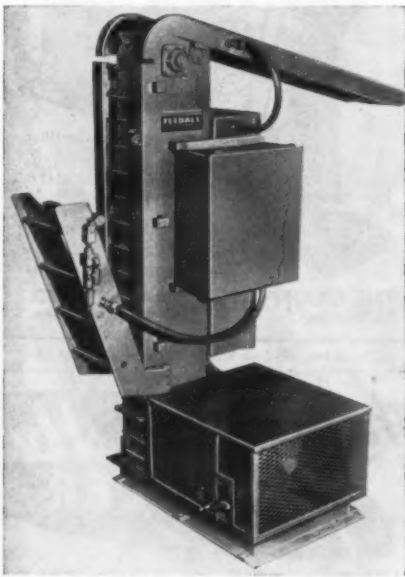
WRITE FOR ILLUSTRATED LITERATURE

LASSY**TOOL
COMPANY****PLAINVILLE, CONN.**

Circle No. 531 on Card, Opposite Page 65

Elevating transfer conveyor

Special Model 4000 elevating transfer conveyor transfers long cylindrical parts from one production machine to another. It accepts parts in a rolling position from discharge chute of the first machine, elevates them and delivers



them to the magazine of the next production machine. The conveyor operates at delivery rate adjusted to that of the second production machine and is equipped with a bank control which shuts off the first machine if it is feeding faster than the second machine can handle parts.

Machine will handle cylindrical parts from $\frac{3}{8}$ " to $1\frac{1}{4}$ " in diameter and up to 12" long. Power is furnished by a $\frac{1}{4}$ hp 220/440 volt motor through a variable speed drive. This unit can be modified to meet individual requirements. Feed-all, Inc., Dept. RH, Willoughby, Ohio.

Repair kit for stripped threads

Tap-Lok inserts are now available in repair kit form to provide a practical method of repairing worn, damaged and stripped threads. Inserts are self-tapping steel bushings, internally and externally threaded, which increase the thread-holding strength of aluminum, magnesium, brass, plastics, cast iron.



Repair kit includes a quantity of inserts

here's *Super*
the
carbide drill
for your job

any quantity
.... any style

- A specific type for every carbide drilling application.
- Exclusive features give greater drill life, faster cutting at lower cost.
- Drills available from stock because of high volume production.
- All sizes, solid & tipped carbide.

Write for Complete 92-Page Catalog.



Subsidiary Van Norman Industries, Inc.

DEPT. 347 • 21650 HOOVER RD. • DETROIT 13, MICHIGAN

WAREHOUSES: CHICAGO • DETROIT • NEW YORK • LOS ANGELES

Circle No. 485 on Card, Opposite Page 65

in the thread size chosen, a driving tool, and illustrated instructions. Groov-Pin Corp., 1125 Hendricks Causeway, Ridgefield, N. J.

Use ACTION Card, opposite page 64. Circle No. 134

Magnetic power control speeds drilling, tapping

Bux magnetic drill press Model V-3 features a rheostat control switch for selecting the proper magnetic pull to fit each particular job. A pilot light

assembly floods the drill point area with light and helps increase operator accuracy.

The switch permits the operator to select the amount of magnetic pull he needs for both holding the drill while positioning and aligning and for grip-



STAGGER TOOTH WOODRUFF CUTTERS

- STANDARD STOCK ITEM
- STANDARD PRICES
- SMOOTHER CUTTING
- LONGER LIFE

Recommended for cutting tough, hard to machine materials.

Agents' and Jobbers' Inquiries Welcome

QUALITY TOOL WORKS

790 S. Market St., Waukegan, Illinois

Circle No. 486 on Card, Opposite Page 65



ping drill to workpiece while he drills, taps or reams. By controlling the magnetic force, the operator can provide enough power to hold his drill to the work so that he does not have to support its weight while aligning, yet still allow enough play so that he can accurately slide the drill point into alignment. Once the drill is positioned, he can turn on full power to hold drill while he works. Buck Mfg. Co., Dept. KE, 100 Roberts Rd., Los Gatos, Calif. Use ACTION Card, opposite page 64. Circle No. 135

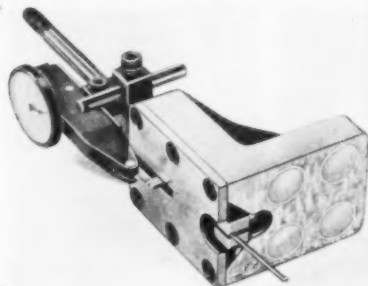
Use Latest Method When Building Dies

This new method of checking tapers on dies does away with die squares and height gauges.

Are you getting what you pay for? Check side angles of your dies for long life. Do it quickly with a Die Checker.

Write for complete details

TIETZMANN TOOL CORP.
D.C. 1 Englewood, Ohio



Circle No. 487 on Card, Opposite Page 65

New!
SPINDLE
BALANCING
DEVICE



New!
DEPTH
GAUGE

LASSY TAPPERS

New exclusive features and top quality make Lassy Tappers outstandingly the finest available, for the tool room—small lot production—and the problem jobs. A low priced investment that soon pays for itself.

Write for illustrated circular showing 3 models, and also Universal Tap and Die Guide.

LASSY TOOL CO. Plainville, Conn.

Circle No. 488 on Card, Opposite Page 65

New **KNURLMASTER**
Hand Knurler

\$13.50



No distortion
even on $\frac{1}{8}$ " stock!
MODEL "C"

For small production runs on $\frac{1}{8}$ " to 1" stock. Exclusive screw design gives perfect knurl pattern. Furnished with 3 hardened knurls of standard $\frac{1}{2}$ " dia. Forged steel frame is self-centering. Write for illustrated folder.

Dealer Inquiries Invited

ROCKWIN MANUFACTURING CO.

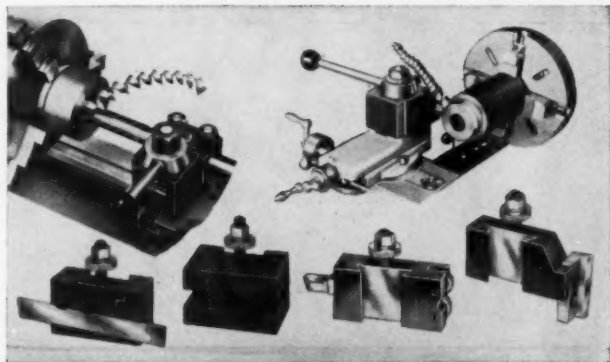
80-C Magnolia St. Westbury, L.I., N.Y.
Circle No. 489 on Card, Opposite Page 65

GET THE MAXIMUM FROM YOUR LATHES by using the **ALORIS** "Quick Change" Patented **TOOL POST and HOLDERS**

Only a second to change tools for turning, facing, drilling, boring, threading, knurling, cutting off or any other operation.

- GREAT REPETITIVE ACCURACY.
- RUGGED CONSTRUCTION.
- TESTED AND RECOMMENDED BY LEADING LATHE MANUFACTURERS.
- GREATER RIGIDITY.
- SAVES 90% IN SET-UP TIME.
- UNCONDITIONALLY GUARANTEED.

Write for catalog and price list.

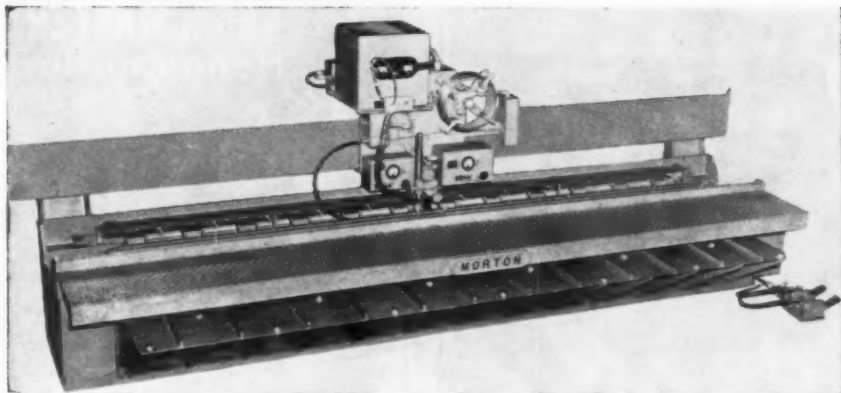


ALORIS TOOL CO., INC.

131-37 SANFORD AVENUE
FLUSHING 55, N. Y.

Circle No. 490 on Card, Opposite Page 65

Stake Welding Machine



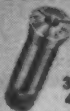
The Morton special stake welding machine is designed for the automatic arc welding of flat stock.

Side loading platforms with ball transfer rolls aid in material handling.

Machine will handle flat stock of all types up to $\frac{1}{4}$ " thickness. Any desired length and height can be built in to meet requirements. Morton Mfg. Co., Dept. JS, Muskegon Heights, Mich.

Use ACTION Card, opposite page 64, Circle No. 136

Specify KASSON Precision Collets and Attachments



3AT,
3C, 1A,
4C, 5C



400 (AC-50) PUSH TYPE. All collets in hexagon, square and round for lathes, milling machines, attachments.



KLUTCH-KOLLET Stop collet. Accurate chucking to $2\frac{3}{4}$ " dia. Soft head for easy boring. Lowest price on market! Models 3AT, 3C, 5C.

FOR ATLAS • LOGAN • SOUTH BEND • CRAFTSMAN • SHELDON LATHES, ETC.

LEVER-TYPE
DRAWBAR
 $\frac{1}{2}$ " cap.

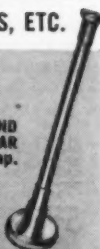


Positive grip on undersize, oversize or standard diameter work. Patented coordinate cams eliminate fingers.

LIVE CENTER
(Ball Bearing). Double sealed for accuracy.



HAND
DRAWBAR
 $\frac{1}{2}$ " cap.



Let us quote on your quantity orders for any types of collets, live center or other machine tool attachments!

KASSON Precision
PRODUCTS

IMMEDIATE DELIVERY FROM STOCK

Guaranteed unconditionally. Distributors inquiries invited.

WRITE FOR FREE LITERATURE!

KASSON DIE AND MOTOR CORP.
32-14 Northern Blvd. • L. I. City 1, N. Y.

Way wiper

The C/R way wiper provides protection wherever metal parts slide over ways in close alignment. It wipes the ways clean, excluding dirt, chips, fine abrasives, cutting compounds but leaves a thin protective oil film. Precision molded for extremely accurate fit, the wiper prevents harmful materials from being trapped behind the wiping lip.


Quickly installed on milling machines, shapers, grinders, planers, gear cutters,

hydraulic rams. Wipers are made in four different types, all incorporating the same basic Sirvene (synthetic rubber) wiping member. Chicago Rawhide Mfg. Co., Dept. RB, 1267 Elston Ave., Chicago 22, Ill.

Use ACTION Card, opposite page 64. Circle No. 137

Bench bin frames

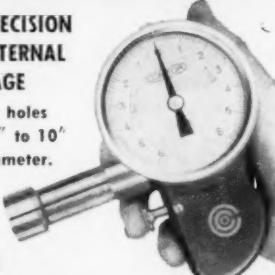
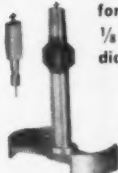
Bathey Mfg. Co., Dept. JS, 100 S. Mill St., Plymouth, Mich., recently introduced four new bench frames for use



This is the actual size of
COMTORPLUG'S
dial showing how
easily you can read it
to fractions of .0001".

**PRECISION
INTERNAL
GAGE**
for holes
1/8" to 10"
diameter.

**What is
your
gaging
problem?**



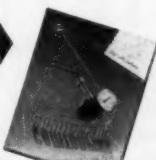
Why not give Comtorplug a chance to solve it?

With a fixed — not passing — reading, Comtorplug shows the exact size of any part of a hole, detecting front or back tapers, ovality, bell mouth, etc. Can be used by anybody — no training program — no hoses, wires or electronic gear.

SEND FOR BULLETIN 49 ➡
It may help answer your problem

COMTOR COMPANY
62 FARWELL ST., WALTHAM 54, MASS.

Circle No. 492 on Card, Opposite Page 63



Great Buys from
VICTOR
 Extra Long, Straight Shank
 High Speed Drills



12" OA, 9" FLUTE

SIZE	PRICE	SIZE	PRICE
1/8	1.65	27/64	3.30
9/64	1.75	7/16	3.30
5/32	1.75	29/64	3.60
11/64	1.85	15/32	3.60
3/16	1.85	31/64	3.60
13/64	1.95	1/2	3.60
7/32	1.95	33/64	4.20
15/64	2.05	17/32	4.20
1/4	2.05	35/64	4.50
17/64	2.15	9/16	4.50
9/32	2.15	37/64	4.75
19/64	2.25	19/32	4.75
5/16	2.25	39/64	5.00
21/64	2.50	5/8	5.00
11/32	2.50	21/32	5.40
23/64	2.75	11/16	5.80
3/8	2.75	23/32	6.25
25/64	3.05	3/4	6.75

18" OA, 13 1/2"-14" FLUTE

SIZE	PRICE	SIZE	PRICE
3/16	4.00	9/16	8.75
7/32	4.10	19/32	9.50
1/4	4.10	5/8	10.00
9/32	4.75	41/64	11.00
5/16	4.75	21/32	11.00
11/32	5.25	43/64	12.00
3/8	5.25	11/16	12.00
13/32	8.00	45/64	13.00
7/16	6.00	23/32	13.00
15/32	6.50	47/64	14.00
1/2	7.00	3/4	14.00
17/32	8.50		

Order Today

IMMEDIATE DELIVERY!

VICTOR

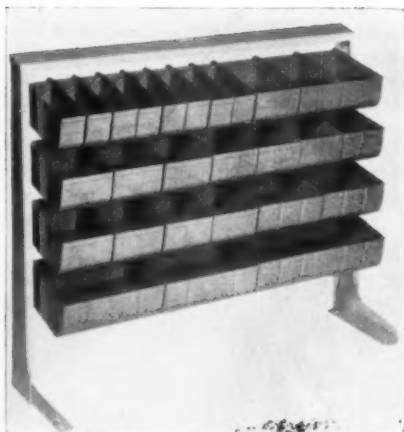
MACHINERY EXCHANGE INC.

Dealers in Tool Room Equipment

251 CENTRE STREET, DEPT. B

Tel: CAnal 6-5575, New York 13, N.Y.

Circle No. 493 on Card, Opposite Page 65



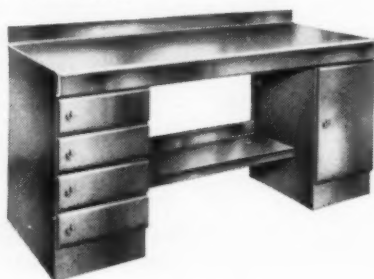
with their removable bin boxes. They include two wide units and two narrow units with four rails and five rails respectively. The wide units are 28" wide x 23" high x 8" deep and the narrow units are 13 3/4" wide x 23" high x 8" deep.

Use ACTION Card, opposite page 64. Circle No. 138

Steel work benches

Newly designed steel work benches featuring double drawer sections, drawers and cabinet, double cabinets, and sliding-door enclosed storage beneath work surface have been added to the line of Equipto Modern-Flow steel work benches.

Four different types of tops are available including 12 gauge steel, Masonite covered steel, laminated wood, or resinwood.



MACHINE and TOOL BLUE BOOK

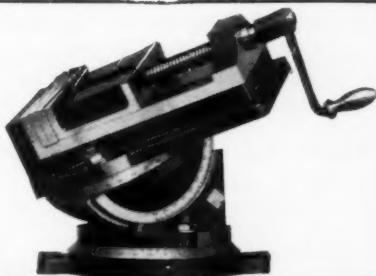
SET UP COMPOUND ANGLES INSTANTLY!

Now save valuable time on intricate, angular set-ups with the fully universal MASTER MULTI-SWIVEL VISE. Three swivels instantly set any compound angle. Used worldwide. Interchangeable platens optional.

Write for circular.

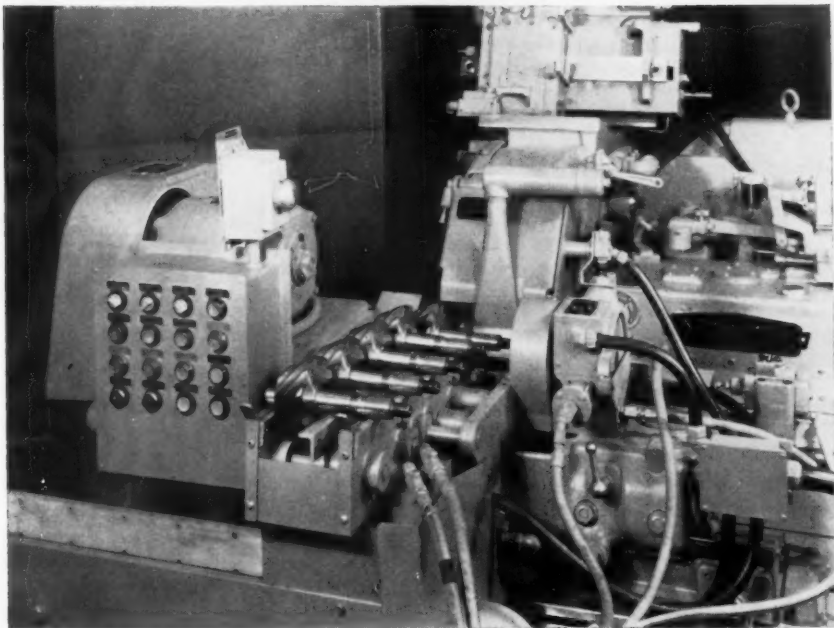
DONOVAN MFG. CO.

80 Batterymarch St. Boston 10, Mass.



Circle No. 494 on Card, Opposite Page 65

Automatic Stem Pinion Grinder



An automatic machine for grinding stem pinions has been developed by Norton Co., Dept. DR, Worcester 6, Mass. Features include special work-holding and driving equipment with automatic loading and unloading devices. One operator may supervise more than one machine.

Because of the awkward, top heavy

characteristics of automotive type pinions, there has always been a high fatigue factor in manual loading operations. In this grinder, the pinions are placed in a loading chute which automatically moves the pinion down inclined ways toward a revolving turret which then places it in position for the footstock center to engage the center

hole and push it forward into the floating type collet on the headstock. The grinding cycle time is pre-selected on the basis of stock removal and finish requirement. Upon completion of the

grind, the revolving turret takes the pinion from the centers and discharges it into an unloading chute from which it rolls onto the conveyor on the front of the machine.

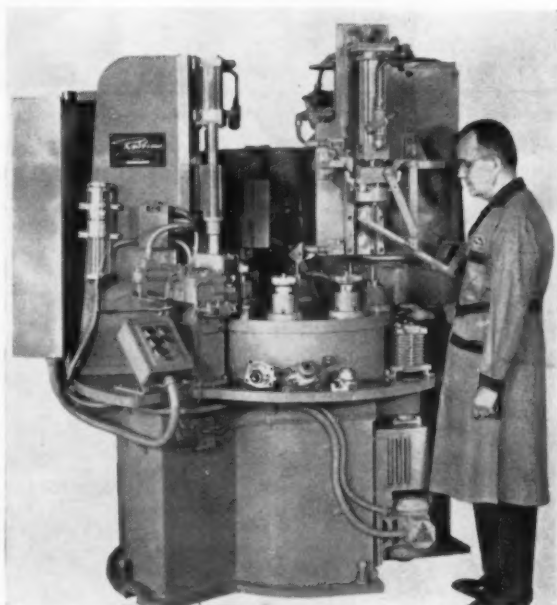
Use ACTION Card, opposite page 64. Circle No. 139

Machine Assembles Parts Automatically

Feeding, positioning, assembling and removal of parts are all done automatically by this eight station assembly machine. Parts are automatically fed and positioned from indexing magazines, while the completed assembly is removed and placed on a conveyor automatically.

A panel with plug-in relays controls the electrical circuit. Controls prevent assembly unless each of the component parts is correctly positioned.

The index table uses both a barrel-type cam and a shot bolt for accuracy, and is operated through a magnetic clutch and brake which provide a one-second index and a four-second dwell. Dwell time is controlled by a synchronous timer and electrical interlocks at each



station. Omer E. Robbins Co., 24800 Plymouth Rd., Detroit 39, Mich.

Use ACTION Card, opposite page 64. Circle No. 140

OPEN

CLOSED

TRADE

AUTOM

MARK

CLOSED

OPEN

Plain Type

CONTINUOUS HINGES

Offset Type

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET

AUTO MOULDING & MFG. CO.

1110 E. 87TH ST.

CHICAGO 19, ILL.

SPECIFICATIONS

Open width $\frac{7}{8}$ " to 6"

Gage Material .040 to .125

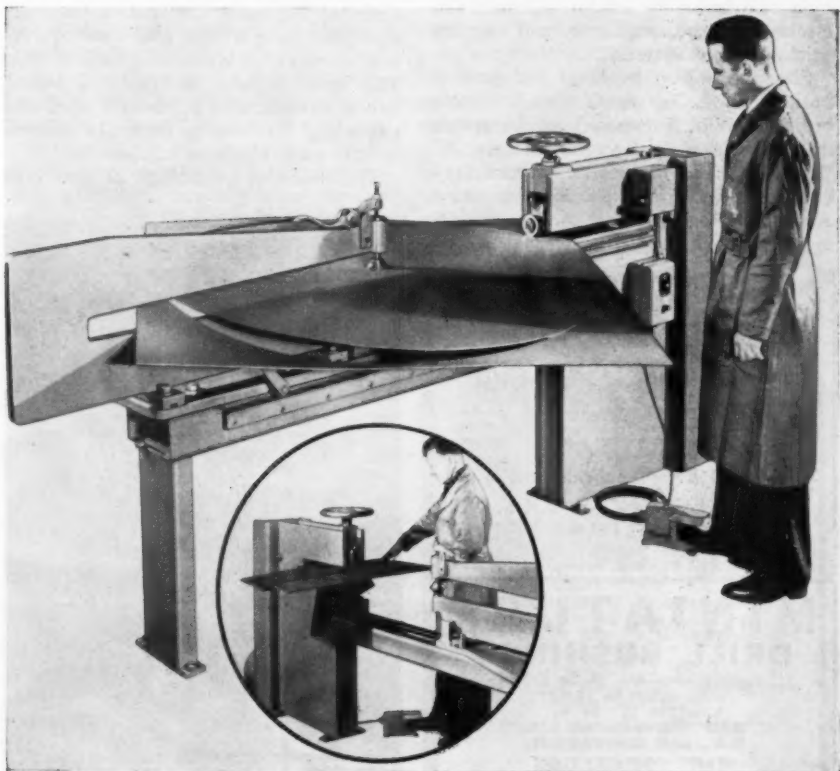
Pin Diameter .101 to $\frac{3}{8}$

Lengths to 120"

SEMI-OFFSET

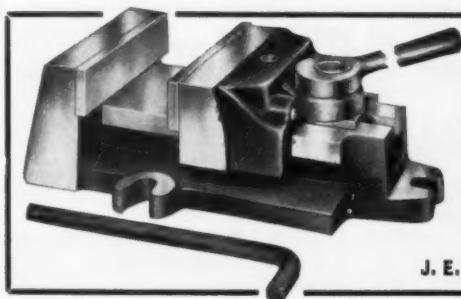
Circle No. 495 on Card, Opposite Page 65

Ring and Circle Shear has Floating Circle Arm



Ring and circle shear No. 31-RC features a self-compensating circle arm which floats on guided ways to main-

tain true center automatically. With a scale provided for convenient setup, an adjustable crank enables quick posi-



Plunket Quick Action Vise for DRILL PRESS or MILLING MACHINE

Designed for production work, using an eccentric motion to apply pressure to jaws. Eccentric motion moves jaws A".

Size No. 7 Net Price
6" Jaws, 1½" deep, opens 4"\$101.00

Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs.

Our complete line includes Vises for Drill Presses, Milling Machines, Shapers, Grinders

WRITE FOR CATALOG

J. E. Plunket Machine Co.

3230-32 Archer Ave.
Chicago 8, Ill.

Circle No. 496 on Card, Opposite Page 65

tioning of the circle arm for cutting circles of various diameters. Actuated by a cam lever, the center clamp of the circle arm is adjustable to hold varying thicknesses of material.

Shear can also be used for cutting both straight line work and irregular outlines. With a capacity of 10 gauge mild steel, it cuts circles from 6" through 78" in diameter. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N.Y.

Use ACTION Card, opposite page 64, Circle No. 141

LEAD HAMMERS— Buy Cook "SHUR-GRIP"



They're a MUST in every shop where many blows have to be struck without marring surfaces. Available with "SHUR-GRIP" drop forged handles.

Write for circular and prices
LAWRENCE H. COOK, INC.

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

Circle No. 497 on Card, Opposite Page 65

MINIATURE DRILL BUSHINGS

Hole Sizes—No. 80 to 3/32"

O.D. 3/32" to 13/64"

Lengths 1/4" to 3/4"

.0002 Tolerance on I.D.,

O.D., and Concentricity

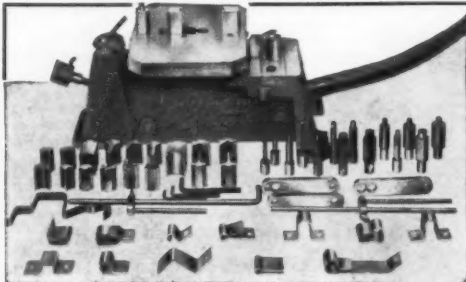
WRITE FOR CATALOG

PREBCO BUSHING CO.

14702 East Arrow Highway

Baldwin Park, California

Circle No. 498 on Card, Opposite Page 65

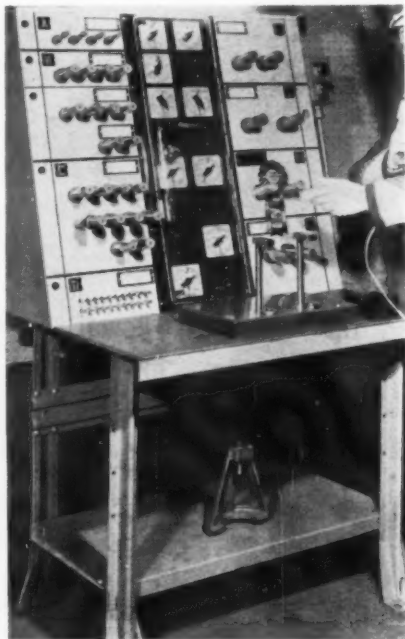


Circle No. 499 on Card, Opposite Page 65

Tool control system

Seibert and Sons, Inc., Dept. JS, Chenoa, Ill., have announced they are manufacturing a new tool control system commonly known as tool boards. The unit includes tool holding board, bench, cyclometers, adjustable adapters, gages and fixtures individually tailored to suit each machine application.

The inherent advantage of this type



Multiform BENDER CUTTER

CUTS, BENDS, PUNCHES

Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend, and cut round or flat brass, bronze, aluminum, steel, etc., up to 8"x1 1/2" as illustrated, other models up to 1/4"x4".

J. A. RICHARDS CO.
KALAMAZOO, MICH.

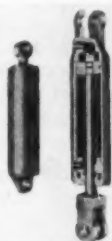
of tool control system lies in the convenient facilities for storing and pre-setting duplicate tools at the machine and the automatic cyclometer control of machine operations, predetermined for each set of tools. In effect, it provides a system of scheduling or programming tool changes to achieve higher operating efficiency.

At the same time, the cyclometer panels provide a visual record for the used and unused life of each tool operating in the machine. Standards of performance for all tools are established which serve to reduce tool breakage, grinding costs, scrap losses, and downtime. Standards are worked out to serve each specific production and machine requirement.

Use ACTION Card, opposite page 64. Circle No. 142

Heavy duty gland cylinders

These heavy duty double and single acting cylinders employ a gland design



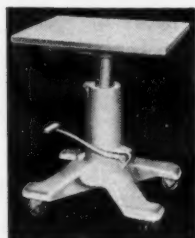
and method of pre-stressing the snap ring within the cylinder which permits

easy maintenance and assures perfect rod alignment, the manufacturer claims.

Aluminum alloy pistons do not corrode or score. V ring rod packings are independently adjustable. Bronze wiper ring on rods are used to prevent foreign material from entering cylinders. Cylinders are honed seamless steel tubing with welded cast steel cleves. Design of the cleves prevents cylinder distortion during welding of the cylinder.

Cylinders are available from 2½"

PORTABLE ELEVATING TABLE



**Saves
TIME
and
LABOR**

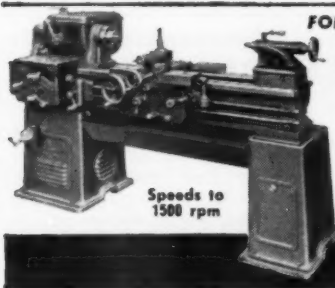
Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height from 31" to 46½", leaving operator's hands free. Table swivels and locks in any position.

Our major services — Designing and Building — Dies, Jigs, Fixtures and Special Machinery.

SEND TODAY FOR ILLUSTRATED CATALOG No. 2

THE MIDWEST TOOL & ENG. CO.
112 WEBSTER ST., DAYTON, OHIO

Circle No. 500 on Card, Opposite Page 65



Speeds to
1500 rpm

FOR FAST, ACCURATE TURNING AT LOWEST COSTS

NEW C & J 16" VARIABLE SPEED ENGINE AND TOOL ROOM LATHE MODEL VS

- Standard taper key drive spindle nose
- Heavy duty precision Timken taper bearings on spindle
- WRITE FOR BULLETIN A56VS

ALSO NEW
16" GEARED HEAD ENGINE LATHE MODEL GH
WRITE FOR BULLETIN A56GH

Carroll - Jamieson Machine Tool Co.
BATAVIA, OHIO, U.S.A.

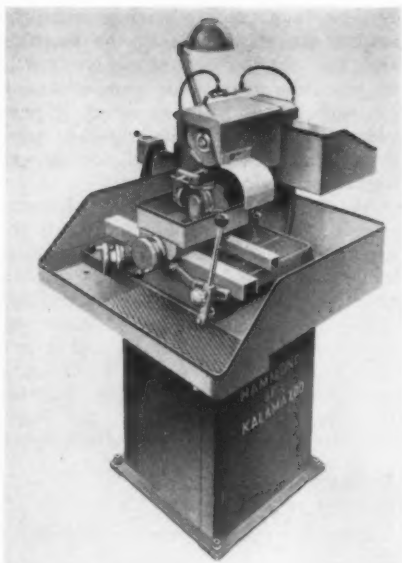
Circle No. 501 on Card, Opposite Page 65

through 4" bore and from one in. through eighteen ft. stroke. They are designed for operating up to 1500 psi. Densmore Engineering Co., Inc., 235 E. Greenleaf St., Compton, Calif.

Use ACTION Card, opposite page 64. Circle No. 143

Chip breaker grinder

This chip breaker grinder, Model CM-6W, is offered as a single end chip breaker grinder only or as a combination chip breaker and diamond finishing



grinder. Grinder incorporates a self-contained pump and tank unit with special no-splash guarding. A flood of coolant is provided, giving continuous cool cutting, increasing diamond wheel life, and eliminating dust problems.

Recommended for light or intermittent duty grinding, the new model has a 1/2 hp built-in drive motor; accommodates 6" dia. chip breaker wheels and with cup wheel arrangement uses a 6" dia. cup wheel. Any-angle vise with four swivel adjustments is furnished on

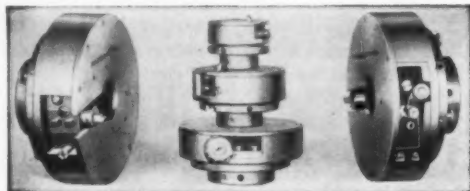


ACCURACY of costly machine tools may be ruined using ordinary bolts of soft steel. It is low cost insurance to use Boyar-Schultz precision made T-Slot bolts. Made from heat treated, Alloy steel, heads machined at right angle to shank, to present a broad, flat surface to upper surface of T-slots. Class 3 threads do not strip or distort. For best results use Boyar-Schultz Special Nuts and Washers.

BOYAR-SCHULTZ CORPORATION

2008 S. 25th Ave., Dept. F-B, Broadview, Ill.

Circle No. 502 on Card, Opposite Page 65



MUMMERT-DIXON FACING HEADS with Automatic Feed

One-way Tool Feed—6, 9 and 12" sizes.

Two-way Tool Feed—9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.

Circle No. 503 on Card, Opposite Page 65

the chip breaker end, providing all angular settings and accommodating tools up to 2½".

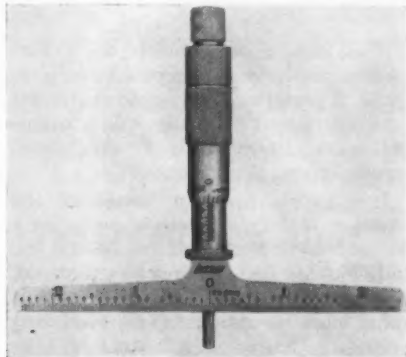
Head raising and lowering adjustments by micrometer dial calibrated to .001". Cross slide, with micrometer screw dial calibrated to .001" moved on dovetail ways with adjustable gib. Carriage slides have protecting guards, and carriage reciprocating lever is adjustable for strokes up to 7".

Equipped with brake lever for quick spindle stopping. Tilting work table on cup wheel end adjusts from 30 above to 30 below horizontal, with table moving in by screw feed. Hammond Machinery Builders, Inc., 1614 Douglas Ave., Dept. HS, Kalamazoo, Mich.

Use ACTION Card, opposite page 64. Circle No. 144

Micrometer depth gage has graduated base

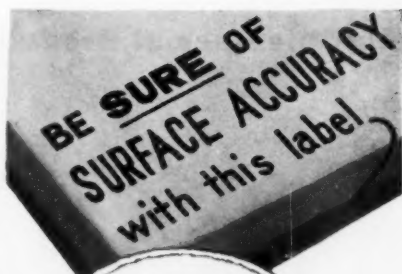
A micrometer depth gage with a graduated base measures the depth of



holes, slots, projections with micrometer accuracy. Base is graduated on one side to permit taking measurements at a specified distance from the edge of the work.

Graduations are in 50ths and extend 2.4" both sides of zero located in the exact center of base. Available in ranges of 3" and 6" with lock nut or with lock nut and ratchet. Lufkin Rule Co., Dept. JS, Saginaw, Mich.

Use ACTION Card, opposite page 64. Circle No. 145



* Balanced Granite

Quartz, the hardest mineral found in granite is present in Herman Granite in just the right proportions to provide a smooth abrasion-free working surface. This quartz in pure crystal form can be seen easily in Herman Pink Surface Plates.

* Registered Accuracy

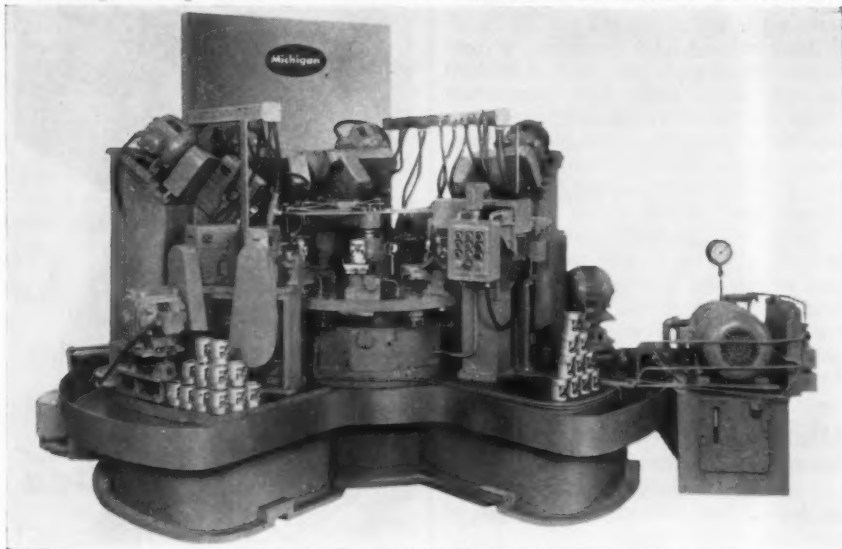
Inspection is with Auto-Collimator used in controlled atmosphere. All tolerance is above datum plane for extra accuracy. A plotted graph signed by Herman inspectors shows accuracy is within your specified limits and plate is registered by serial number at our factory.

write for descriptive folder.



Circle No. 504 on Card, Opposite Page 65

Multiple Special Produces 1200 Pistons Per Hour



THREAD GRINDING AND PRECISION MACHINING

WARD THREAD GRINDING COMPANY

265 Howard Ave. Bridgeport, Conn.

Circle No. 505 on Card, Opposite Page 65

This new Special finish drills 1200 pistons per hour. During each complete cycle, it performs 10 separate operations on each piston: finish drills four angular holes; finish drills six horizontal smoke holes.

It is an eight-station, horizontal and angular, dial-type machine featuring a 42" automatic hydraulic index table and individual, automatic indexing fixtures. A mounting plate, 60" in diameter, facilitates the mounting of the indexing



BROACHES & FIXTURES

Conant offers complete engineering and manufacturing facilities for your broaching needs. Expertly designed for proper strength and chip carrying capacity. Prompt broach sharpening and reconditioning service. Order standard keyway broaches from our stock. Your inquiry invited. Send us part prints for recommendation and quotation.

CONANT BROACH COMPANY
347 W. 107th ST.
CHICAGO, ILLINOIS



Circle No. 506 on Card, Opposite Page 65

"MULTI-INSULATION"

is the secret of . . .

HUPPERT

Floor Model Furnaces

These sturdy production type Huppert electric furnaces not only attain highest efficiency, but also cut operating costs to a minimum through the unique Huppert method of using multi-insulation surrounding all sides of the heating chamber. Heat range—continuous up to 1850° F., intermittent operation to

1950° F., can also be built for 2300° F. operation.

This furnace comes complete with an indicating electronic temperature controller, and a tight seating, wedge-type door is used. Standardly furnished for 220 V. AC single or 3 phase operation. (110 V. or 440 V. models to order).

This model built in 20 different sizes.

Model No. 16 illustrated—12"x8"x18"—\$1014.00 complete

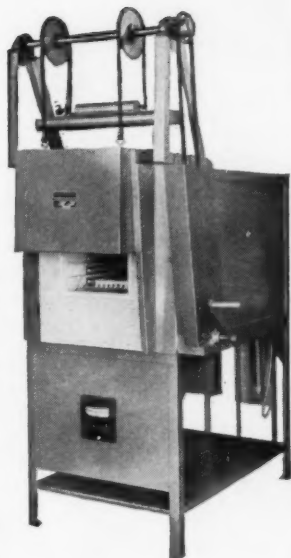
Write for literature on complete line of Huppert furnaces and ovens.

K. H. HUPPERT CO.

6845 Cottage Grove Avenue

Chicago 37, Illinois

Manufacturers of Electric Furnaces and Ovens



Circle No. 507 on Card, Opposite Page 65

fixtures. These fixtures make it possible to drill both the odd angular holes, as well as the horizontal smoke holes, on the one machine. The completed pistons

are ejected automatically at the 8th station. Michigan Drill Head Co., Dept. JS, P.O. Box 4643, Detroit 34, Mich.

Use ACTION Card, opposite page 64. Circle No. 146

Tracer Milling Unit

The ram support of this three dimensional tracer milling unit has transverse and longitudinal keyways with suitable mounting provisions on all four sides and the end. The tracer stylus arm also has several manual mounting positions. The unit makes it practical to take numerous cuts on large workpieces by moving the cutter rather than the workpiece itself.

The transverse and longitudinal movements of the cutter are 12 inches, depth movement 8 inches. All three movements are manually controlled from a single pencil type stylus tracing unit to enable duplication of patterns

on the workpieces. Each movement has a quick shut-off valve for independent use of any one movement. The cutter head slide has a micrometer screw depth stop for accurate depth location for the full range of cutter travel. The linear and depth duplicating speed of the cutter is variable within a range of 1" to 50" per minute.

The stylus has a positive lock adjustment on all three movements to enable the locating of the cutter in relation to the stylus on the template. To allow for the changing of various size tracing stylus without changing the cutter, a quick change, positive lock stylus chuck has been provided.

The unit shown has a belt driven



three hp head with four possible speed changes of 200, 400, 900 and 1800 rpm. Also available is a three hp head with infinitely variable speeds between the range of 200 to 1800 rpm. In addition, five hp heads of either the four speed belt driven type or the infinitely variable speed type can be furnished. Sundstrand Machine Tool Co., Dept. RB, 2531 11th St., Rockford, Ill.

Tapping attachment permits heavy tapping on small drill presses

A planetary gear arrangement which reduces tap speed to 1/3 the drill spindle speed gives the No. 3-B tapping attachment the extra power needed to tap or thread large holes on small drill presses. Tapper features a sensitive

Use ACTION Card, opposite page 64. Circle No. 147

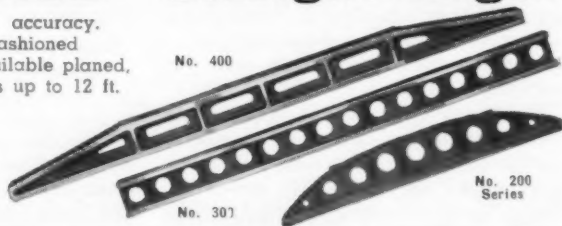
"MILWAUKEE" Straight Edges

Famous for long-lasting accuracy. Made from Meehanite—fashioned by skilled craftsmen. Available planed, scraped, or ground. Sizes up to 12 ft.

Write for Bulletin

J. C. BUSCH CO.

Engineers & Machinists Since 1907
165 S. Barclay St.
Milwaukee 4, Wis.



Circle No. 508 on Card, Opposite Page 65



steel clutch and enclosed oil bath. In operation, a fan on the steel clutch whips the oil into a fine mist which provides more efficient cooling and more effective lubrication. Maximum tapping and threading capacity is $\frac{1}{2}$ " in steel. Etco Tool Co., Inc., Dept. RS, 594 Johnson Ave., Brooklyn 37, N.Y.

Use ACTION Card, opposite page 64, Circle No. 148

New motor line

The Lincoln Electric Co., Dept. RH, Cleveland 17, Ohio, has announced its re-entry into the electric motor field. The company has introduced a new line of "Linc-Weld" motors having a unique extruded plastic insulation.

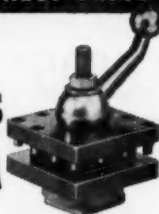
The motors are available in standard sizes from 1 to 40 hp. They are built in the open type frame and torque design B.

The plastic insulation is molded into and around the stator windings. The

**MANHATTAN'S MIRACLES!
TOP VALUE — LOWEST PRICE**

TURRET TOOLPOSTS

SAVE 33 1/3 %



12 position indexing • Machineable base
Block can mount 4 different tools • 3 working
positions • Precision made in West. Germany

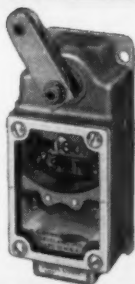
Model	Tool Block	Tool Range	Price
2 1/2"	2 1/2" x 1 3/8"	1/4" x 3/8"	\$16.00
3 1/2"	3 1/2" x 1 3/4"	3/8" x 1/2"	\$24.00

*For tremendous savings, write for
circular listing sensational bargains.*

MANHATTAN SUPPLY COMPANY
The Cutting Tool Discount House
151-A GRAND ST., NEW YORK 13, N. Y.
Telephone: CAnal 6-4992

Circle No. 509 on Card, Opposite Page 65

WATERTIGHT!



**OVER
5,100,000
CONTACTS
UNDER
WATER!**

(Switch Reversing
Actuating Motor)

LOXSWITCH Heavy
Duty
LIMIT SWITCHES

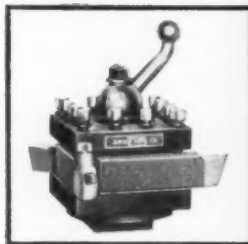
FREE 4 page folder describing 7 models,
19 contact arrangements.

R. B. DENISON MFG. CO.

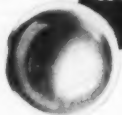
102 St. Clair Ave. N.W. • Cleveland 13, Ohio

Circle No. 510 on Card, Opposite page 65

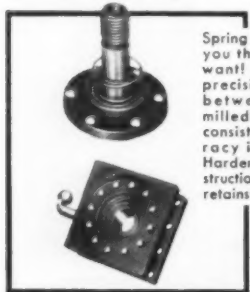
Enco Turrets Assure ±.0005" Accuracy



by
being
on the
ball!



Enco's passion for exacting accuracy is paying off in metal working operations everywhere! Combining precision lathe output with efficiency and economy has become a necessity . . . and Enco turrets have proved the ideal answer. An Enco turret transforms one lathe into a production machine, each operation of unsurpassed accuracy due to *spring loaded ball design!*



Spring loaded balls give you the accuracy you want! Hardened steel precision balls locked between accurately milled spherical seats consistently give accuracy in re-indexing. Hardened all steel construction minimizes wear, retains built in precision.

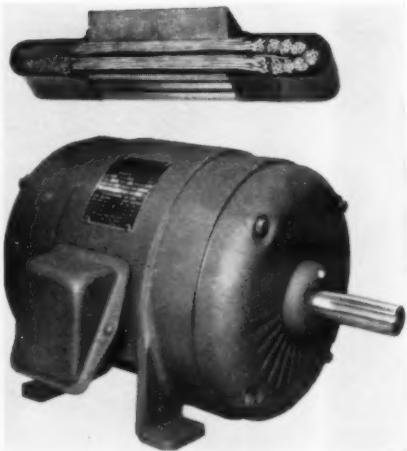
Write today for catalog No. 53. There's an ENCO turret for every lathe.

ENCO

Manufacturing Company, 4520 W. Fullerton Ave.
Chicago 39, Ill., Dept. 2106

Circle No. 511 on Card, Opposite Page 65

330



motor stator is placed into a die and the plastic material is forced into the die under the proper heat and pressure. The liquid plastic resin is extruded through the stator slots, completely covering the stator winding. After the plastic resin sets, the stator is removed from the die. The result is a motor winding that is encased in a rigid, tough and durable mass.

Use ACTION Card, opposite page 64. Circle No. 149

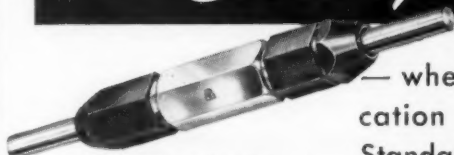
Screw machine drills

Whitman & Barnes high speed, straight shank, short length drills are



MACHINE and TOOL BLUE BOOK

IT'S *Economy* ALL THE WAY!



**A. G. D. PLUG &
RING GAGES**

— when you order your duplication requirements for these Standard Items . . .



"TRU-LOC"
Adjustable Adapter
Sleeves and Nuts

**A. S. A.
DRILL JIG
BUSHINGS**



"Economy" stocks always complete to assure immediate delivery. Worn-out plugs and ring gages salvaged at low cost.

Ask about the new "Economy" Extended O.D. Symbol Range. Dimensional Data Sheet No. 7-A Upon Request.

ECONOMY TOOL & MACHINE CO.

1829 SOUTH 68th STREET
MILWAUKEE 14, WIS.

Circle No. 512 on Card, Opposite Page 65

specifically designed for use in screw machine drilling operations. Engineered with correctly proportioned web thickness, flute contour and spiral, the drills provide ease of penetration, efficient chip removal and long life between resharpenings.

Drills are available in fractional, wire gauge and letter sizes in both right and left hand styles. Whitman & Barnes, Dept. JS, 40600 Plymouth Rd., Plymouth, Mich.

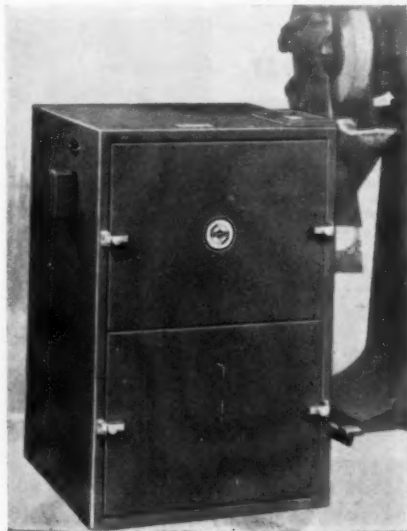
Use ACTION Card, opposite page 64. Circle No. 150

Horsepower boosted on dust collector

Horsepower has recently been increased from $\frac{1}{2}$ to $\frac{3}{4}$ to deliver higher performance for the Model 64 dust collector, according to Torit Mfg. Co., Dept. RB, 297 Walnut St., St. Paul, Minn.

The unit can be used with double-end pedestal grinders having wheels up to 10" diameter, single spindle disc grinders or sanders up to 18" diameter, tool and cutter grinders, polishing and buff-

ing wheels, surface grinders and lathe operations involving cutting or grinding



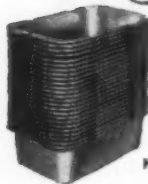
"PAK-N-STAK"

STRAIGHT

Bathey



Leak proof drawn steel.
Most economical pan
offered to industry



Length 18 1/2"
Width 11"
Depth 5 1/2"

Nested



Stacked

Dealers in principal cities.

Write for catalogue



BATHEY MFG. CO.

100 SO. MILL ST.

PLYMOUTH, MICH.

Circle No. 513 on Card, Opposite Page 65

**economically priced
press room equipment**

DURANT

Scrap Choppers

Four models to fit
any power press.
Employs simple elec-
trical plug installation.
Low initial cost.
Enables you to get
more for your scrap.

Manufacturers of
Stock Reels, Roll
Feeds, Straighteners,
Scrap Choppers, Die
Pullers, Foot Presses,
Coil Cradles, Press
Guards, Stock Oilers.



WRITE FOR NEW FREE CATALOG

DURANT TOOL SUPPLY Co.
PROVIDENCE 3, RHODE ISLAND

Circle No. 514 on Card, Opposite Page 65

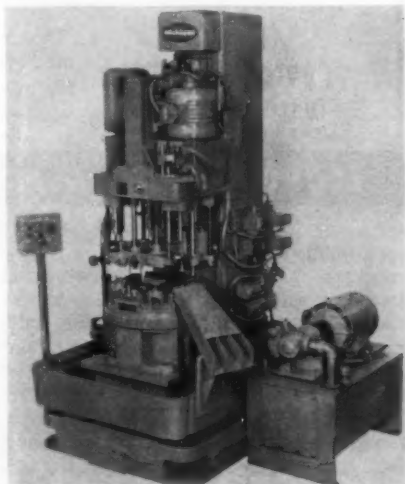
332

that create noxious dust. Twenty-four cloth filters provide 60 sq. ft. of filtering area. When used with one 4" inlet, the unit moves 500 cfm of air at 5700 fpm air speed and a static pressure of 4" (water).

Use ACTION Card, opposite page 64. Circle No. 131

Small machine does big job

A little machine, completely auto-
matic, drills, chamfers, and taps a 5/8-18
hole in each of 750 flange nuts per
hour and ejects the complete part into
chutes.



It is built to JIC hydraulic and elec-
trical standards. There is automatic
lubrication throughout, and a self-
contained coolant tank built into the
base of the machine.

This special has been engineered and
built using standard components: Hydro
3 vertical unit, with a 6-spindle com-
bination drill and individual lead screw
tapping head. There's a 20" 5-station, 2-
place fixture with power clamping and
an automatic eject. Michigan Drill Head
Co., Dept. JS, P.O. Box 4643, Detroit 34,
Mich.

Use ACTION Card, opposite page 64. Circle No. 132

MACHINE and TOOL BLUE BOOK



KOENIG TWO SEAT VERNIER DEPTH GAUGE

Of particular design, easily and quickly measures distance of projections, depth of holes, etc.

ITS FEATURES

Solid head, hardened, ground and lapped.

Two Verniers, to obtain otherwise difficult measurements.

Compact design to permit the use of 1" scales.

Accurate machine divided graduations.

Furnished with case in 1" to 12" size scales—18", 24" and 36" also available.

Prices on application.

A necessary tool in every tool crib and mechanic's tool box.

WM. A. KOENIG

108 Mt. View Ave. Troy, New York
Telephone Ashley 2-8631

Circle No. 515 on Card, Opposite Page 65

2 New Tools FOR THE MACHINIST



THREAD TRIANGLES

Will quickly measure all 60° pitch diameters, 4 to 56 pitch all O.D.'s standard and non-standard. No fancy calculations. Just add a constant to the O.D. Comes complete with chart and case \$10.00



POCKET GAGE FOR SURFACE FINISH

With 22 precision surfaces from a 2 micro inch hand lapped finish to a 500 micro inch milled finish. Made to A S A standards. Complete with case \$15.00

Sold on Approval—Catalog on Request

MONTGOMERY TOOLS

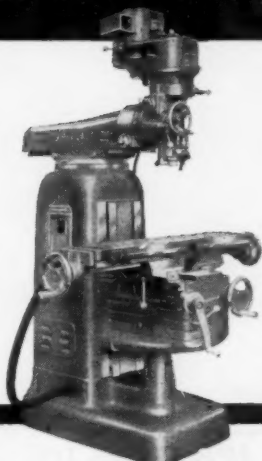
Bigelow 8-1045

7A TICHENOR LANE NEWARK 5, N.J.

Circle No. 516 on Card, Opposite Page 65

October, 1956

FOR LOWER COST
HIGHER QUALITY
WESTBURY
VERTICAL MILLS
Models 1-S and 1-R



Hardened and ground high-speed ball bearing spindle—5" quill travel, micrometer depth stop—Three feeds, .0016; .003; .005—Rapid spindle change over, 8 speeds (80-2713) — Dovetailed over-arm (1-S)—Round over-arm, (1-R)—Precision angle setting control — Rigidly mounted table—42 $\frac{3}{4}$ " x 9 $\frac{1}{16}$ " — 30" longitudinal range, 10" transverse, 16" vertical—Positive locks—Motor, 1.5 H.P. — Weight, 2200 lbs. Available with duplicating attachment Mod. FR for hydraulic precision reproduction of molds, patterns, and templates in any material.

Write, wire
or phone for
descriptive
literature

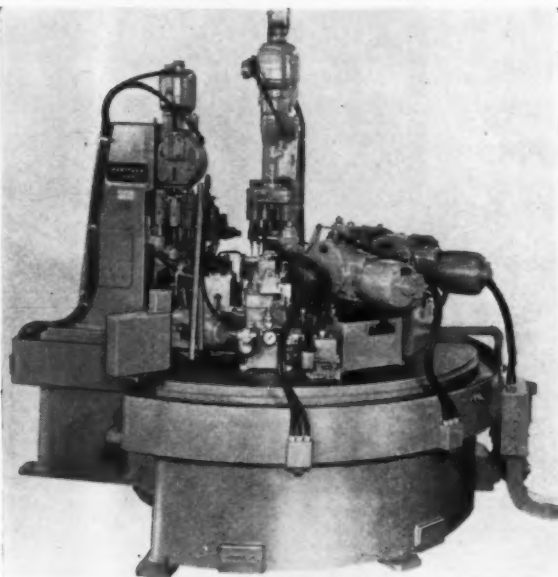
Distributors
in principal
cities



Maserati Corporation of America
Westbury, L.I., N.Y.

Circle No. 517 on Card, Opposite Page 65

Twelve Station Drilling and Milling Machine



This twelve station horizontal indexing drilling and milling machine is used to drill, tap, slot, straddle mill and broach nine different brass throttle shafts. Five cam feed drill units, one lead screw tapping unit and one air operated broach are used to process the parts. Four drill units with milling attachments are mounted horizontally and one vertically. The lead screw tapping unit is mounted vertically. Parts are loaded in a vee-block with hand screw clamp and automatically indexed through the processing cycle. Production at 100% efficiency is 600

parts per hour. Hartford Special Machinery Co., 264 Homestead Ave., Hartford 12, Conn.

Use ACTION Card, opposite page 64. Circle No. 133



**NEW NESTING TYPE
TOTE PANS**

Sturdy 16 ga. metal.
20" long x 12" wide
x 6 1/4" deep. Drag
holes and handles at
both ends.

J. L. LUCAS & SON, INC.
Bridgeport 5, Conn.

Circle No. 518 on Card, Opposite Page 65

NEW BRITAIN



Jaws — 1 1/2" x 5 1/4"
Maximum Opening 4"
Weight 37 Lbs.

Write for further
information.

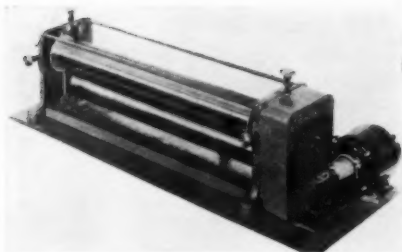
SWIVEL VISE

The body is made of semi-steel; the jaws of tool steel hardened and ground. All working surfaces are ground. The vise is as accurate as is possible and the degrees are cut to very close limits.

NEW BRITAIN TOOL & MFG. CO.

13 HARVARD STREET
NEW BRITAIN, CONN., U.S.A.

Circle No. 519 on Card, Opposite Page 65



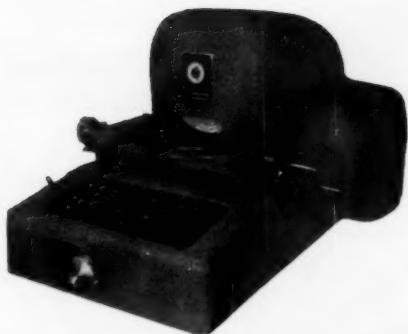
discs mounted at end of rolls confine coating material to reservoir area.

Models are produced in single top coater, bottom coater, and two double styles in lengths from 8" to 52". Grooved rolls also available for heavy adhesives. L. R. Wallace & Co., Dept. KE, 191 N. Pasadena Ave., Pasadena 3, Calif.

Use ACTION Card, opposite page 64. Circle No. 154

Rotary table for tag marking typewriters

A rotary table, attachable to most



models of Autemark electric tag marking typewriters, makes possible the marking of round tags at high speeds. Table is also attachable to the hand lever actuated typewriter.

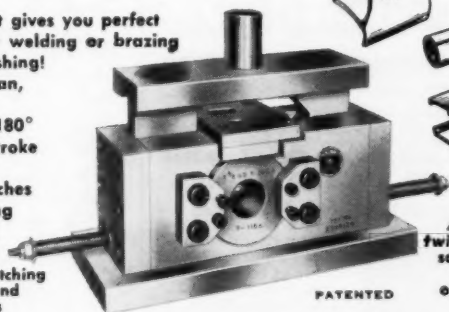
All parts of the table are hardened and precision ground. Defiance Machine & Tool Co., Dept. HS, 1920 S. Vandeventer, St. Louis 10, Mo.

Use ACTION Card, opposite page 64. Circle No. 155

the **ARC-TWIN** *Cuts Two Perfect Notches* in *One* Downstroke of Press!

SAVING both time and cost, it gives you perfect T-joints — instantly ready for welding or brazing without deformation or finishing! Twin-acting punch shears clean, from inside out, leaving two matching notches (in perfect 180° alignment) with every downstroke of the punch press. Quickly interchangeable dies and punches accommodate pipe and tubing from ½" to 2½" O.D.; special units, up to 3" O.D.

Special Arc-Twins for double notching stainless steel or monel metal and units built to your specifications can also be furnished.



Ask for
twin-notched
sample of
pipe
or tubing

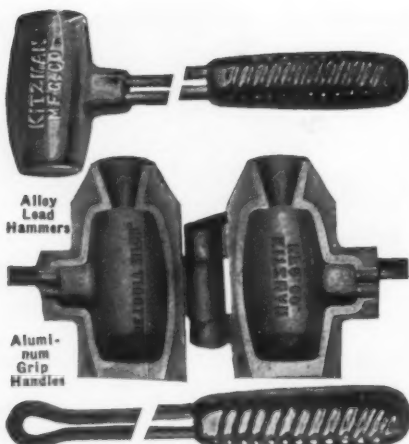
PATENTED

VOGEL

TOOL AND DIE CORPORATION

1825 North 32nd Avenue
Melrose Park, Illinois

Circle No. 520 on Card, Opposite Page 65



Alloy
Lead
Hammers

Alumi-
num
Grip
Hammers

Hinged Hammer Moulds

1, 2½ and 5 lb. sizes—order your alloy lead hammer requirements from your machine tool supply house

or direct from:

KITZMAN MFG. CO.

15061 Hartwell Ave. Detroit 27, Mich.
Circle No. 521 on Card, Opposite Page 65

CAMS

To Your Specifications
except Screw Machine Cams

Design Assistance Offered

KIDDE PRECISION TOOL CORP.
25 LOCUST AVE. ROSELAND, N.J.

Circle No. 522 on Card, Opposite Page 65

Accurate Hole Transfer Made Easy With
NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.

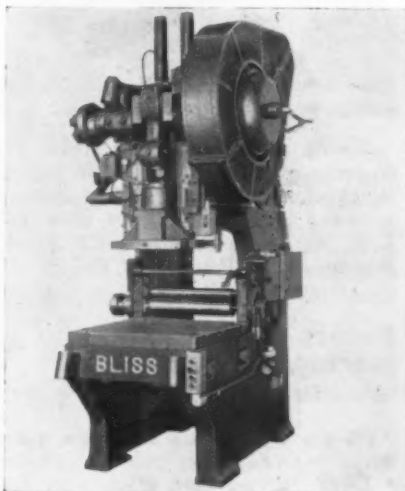


Write for Circular
NIELSEN TOOL & DIE COMPANY
17360 Lahser Rd.
Detroit, Michigan

Circle No. 523 on Card, Opposite Page 65

Pie plate press

A press especially designed for production of pie plates, cake plates, TV dinner trays and similar aluminum foil products has been developed by E. W. Bliss Co., Dept. RH, 1375 Raff Rd., Canton, O.



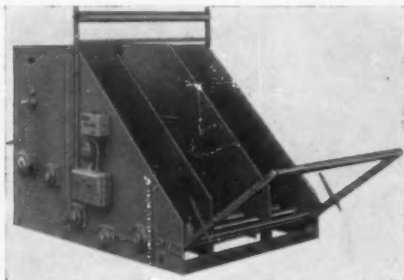
This 21½-F foil press has a capacity of 50 tons and incorporates a number of unusual features that have been found necessary for the rapid and economical production of aluminum foil items.

The method of feeding, for example, involves a precision-type single roll feed mounted between the uprights that takes foil directly from the coil and feeds it forward across the die area. The 18" depth of throat together with the large opening in back on this press permits the use of a roll feed with 24½" wide feed rolls and a maximum feed length of 18". These factors, combined with the flanged slide and heavy duty air counterbalances, permit a wide range of both large single die or smaller multiple die work. A variable speed drive gives an operating range of 60 to 120 strokes per minute.

Use ACTION Card, opposite page 64. Circle No. 156

Improved stock feeders

A new series of improved Koil-Kradles handle coil stock up to 48" wide and 60" in diameter, in capacity ranges from 1200 lb. coils to 16,000 lb. coils. Units are capable of supplying and maintaining a slack loop from which any automatically fed machine can draw. By pulling from the slack loop instead of against the weight of a heavy coil, automatic feeding devices are more accurate and higher running speeds are practical.



A new actuating linkage increases versatility of operation without use of attachments or accessories. The linkage is fully adjustable within a 90° arc and is designed to permit use either inside or outside of the slack loop. Material can be supplied either curvature up or curvature down, depending upon die design.

In operation, as the stock is used, all slack is tightened, depressing the spring-loaded actuator bar. This energizes the motor, rotating four power-driven rolls which cradle the stock, forming a new loop. Release of the stock tension permits the actuator bar to open the motor switch. At this time the Variloop control, a time delay mechanism, keeps the motor running for an additional period up to 10 seconds. This eliminates continual motor stops and starts, smooths out the flow of material and reduces wear on motor and cradle. Benchmark Mfg. Co., Dept. KE, Gardena, Calif.

Use ACTION Card, opposite page 64. Circle No. 157

October, 1956

New "Series 333" Drills for Drilling Cast Iron!



ACE

CARBIDE DRILLS

Whatever your carbide drill requirements may be... whether solid carbide or carbide tipped... it always pays to make sure you use an "ACE". Their "ground-from-the-solid", highly polished flutes have keener, stronger cutting edges. And that means finer accuracy, longer tool life, and lower drilling costs for you!

Call your local Ace Drill Distributor today!



ACE DRILL

ADRIAN, MICHIGAN

ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS

Circle No. 524 on Card, Opposite Page 65

337

Mechanics Through The Ages

EARLY MONASTERY

MANUSCRIPT SCRIBES AND ILLUMINATORS USED SUN DIALS AS THEIR "TIME" CLOCKS ON BRIGHT DAYS AND DEPENDED UPON WATER CLOCKS IN GLOOMY WEATHER.



THE GREAT 16TH CENTURY RELIGIOUS FIGURE, **MARTIN LUTHER**, WAS AN ACCOMPLISHED TURNER AND KEPT A LATHE IN HIS HOME IN ORDER TO GAIN A LIVLIHOOD BY HIS HANDS IF HIS RELIGIOUS WORK FAILED TO SUPPORT HIM.

AL REETZ-

BY THE LATE 1800'S **CLOCKMAKERS** OF EUROPE WERE OBLIGED TO SUBCONTRACT THE MAKING OF PENDULUMS FOR THEIR LARGER CLOCKS TO LOCKSMITHS — BECAUSE PENDULUMS HAD BECOME TOO HEAVY TO BE HANDLED ON THE EQUIPMENT CLOCKMAKERS USED!

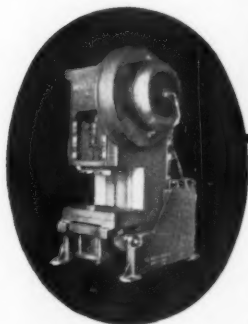


A Minster Press means LESS SCRAP

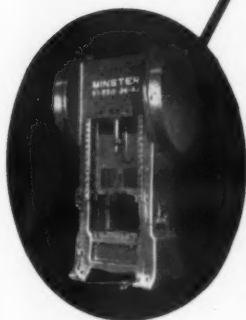
BUY MINSTER
AND BE SURE
YOU GET THE
RIGHT PRESS
FOR THE JOB



What did your scrapped stampings cost you this week in material, labor, machine time, production loss and rehandling?



Minster
Series 1 O.B.I. Presses



Minster
Series S-1 Presses.



Minster
Series S-2 Presses

Minster Presses cut scrap loss, save you money because they provide:

1. Greater frame rigidity, with less deflection.
2. Extra long ways and gibs, widely spaced and precision finished, assure slide and bed parallelism.
3. Fast action, controlled cycling with Minster's patented Air Operated Combination Friction Clutch and Brake.
4. Minster Controls combine with fast clutch action to help reduce scrap caused by misfeeding.

Build a sound, replacement program modernize with Minster Presses

THE MINSTER MACHINE COMPANY

MINSTER, OHIO

Circle No. 525 on Card, Opposite Page 65

MINSTER® P R E S S E S

to economize
STANDARDIZE
with

RING



precision PUNCHES and DIES



Ring Standardized Punches and Dies offer cost saving dependable performance for all of your perforating problems.

Precision volume production to rigid specifications offers

- ★ Low cost
- ★ Complete interchangeability
- ★ Immediate shipments from stock on Standards plus prompt delivery on Specials
- ★ High quality — long life

MANY SHAPES AND TYPES



ROUND



SQUARE



OBLONG



HEXAGON



RECTANGULAR

Blanks — Pilots — Headless — Shoulder and Bevel Head Quills — Slug Ejector Punches — Transfer Punches

NEW!

Tough — Accurate Retainers for Ring Punches and Dies mount easily to your die set. Available in Key Type for irregular shapes.

WRITE FOR OUR ILLUSTRATED CATALOG



RING PUNCH & DIE COMPANY

27 Fenton Place

Jamestown, N. Y.

The MARKET PLACE

Advertisements acceptable in THE MARKET PLACE include those for employment, sales services, production facilities, representation and related needs. **Rates: \$20 per column inch per insertion. Maximum size advertisement accepted in this section is three inches.**

Copy should reach us by the first of the month for next month's issue.

MACHINE and TOOL BLUE BOOK

A Hitchcock Publication

Wheaton, Ill.

CUTTERS SHARPENED

End Mills, Milling Cutters, Reamers, etc.
High Speed Steel or Carbide
Lowest Prices—Top Quality—
1 Week Delivery
Special Cutters made to your requirements.
Send for Catalog and Sharpening Prices

LUND MFG. CO.

8 Music Hall Avenue Waltham 54, Mass.

Masters' ARBOGA

with Low Cost - High Quality
Vertical Mills - Drills & Grinders

For further information, write to

118-122 Church St.
Newtown, Ohio

3611 Archer Ave.
Chicago 9, Ill.

QUICK, HANDY REFERENCE

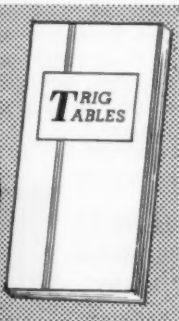
This pocket size book gives you Trig Tables and a wealth of other useful tables.

An accurate reference which saves time and eliminates error.

6 or more.....75 each
Cash or money order

Taylor Associates

8238 W. Forest Preserve Dr.
Chicago 34, Illinois



ONLY \$1.00

SALES OPPORTUNITY! Specialty Tool Representatives wanted to represent fast selling machine tool item, selling direct to industrial users. Increased machine shop activity makes this item a sure-shot sales and profit opportunity.

Wire or write Box 100

**MACHINE and TOOL BLUE BOOK
WHEATON, ILLINOIS**

END MILLS SHARPENED good as new - - - or better

.85 per end from 3/16 to 15/16 dia.
1.25 per end from 1" to 1 1/2" dia.

Return postage paid on orders for
\$25.00 or better. 1 week delivery.

We also sharpen carbide end mills.
Prices upon request.

CUTTING TOOLS, INC.
134 Seymour Street
Stratford, Conn.

"Key to Preventive Maintenance" MACHINE TOOL RECONDITIONING & the Art of Hand Scraping (New 2nd printing)—useful for design, shop & inspection work—

Write for folder describing illustrated book
MACHINE TOOL PUBLICATIONS
215 Commerce Bldg., East 4th St.
St. Paul 1, Minn.

10 to 12 foot lengths

Any diameter up to 1 1/4 inch

All thread forms

All metals



For studs,
hangers, worms,
translating screws, etc.

25-45 Barelay St.
Eastern Machine Screw Corp. New Haven, Conn.

Make your own Storage & Pallet Racks



with Amidon Fittings
and one inch pipe.

Amidon Engineering Co.
ELYRIA 10, OHIO

WARNER

CLUTCHES
BRAKES
& PARTS

SHIPPED FROM STOCK

WOOD-COMPTON CO.

25010 LAKELAND BLVD., CLEVELAND 32, O.

**FILES AND
VACUUM PUMPS**

WRITE US.

WILLIAM REID CO.

2271 Clybourn,

Chicago 14, Ill.

BREMIL

The IMPROVED Compound Lever Shears

ALL ALLOY
FULLY
GUARANTEED



Two Sizes

PORTABLE

No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to 1/4" steel plate.

BREMIL MFG. CO.

1020 Holland Street, Erie, Penna

**READING BENCH
KEYSEATER**

Portable — move
directly to job; a
time saver for
both small and
large shops.

3/4" stroke;
adaptable for
other work.

Low first cost,
prompt delivery.
Good dealers wanted.

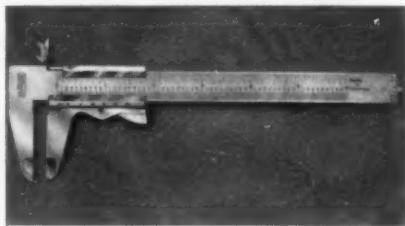
Reading Machine Co.
Cincinnati 37, Ohio



Pocket vernier caliper

The Wilh. A. Kunkel Co. in Aschaffenburg, Germany, has announced a pocket vernier caliper which makes possible easier and better reading through an extended vernier.

Features include measuring jaws and



points of one-piece construction, fully hardened beam elastic, hard measuring faces, beam lapped on all sides, measuring faces super lapped. Graduations are very fine but clearly read. U. S. representative is Krueger Importers, 23418 Harper Ave., St. Clair Shores, Mich. Use ACTION Card, opposite page 64. Circle No. 158

**MAGNIFIES
"HARD-TO-
READ"
VERNIER
SCALES
ON HEIGHT
GAGES
AND
CALIPERS**



No more eye strain, guess work or hit or miss setting and reading. LENS is finest quality optical glass, specially designed and ground for the purpose with utmost optical skill. 4X magnification shows lines true and correct. In daily use in plants of Westinghouse, General Electric, General Motors, Chrysler, Packard, Ford, Boeing Aircraft, Bendix Aviation and many others engaged in defense work. Made in 3 sizes to fit Starrett, Brown & Sharpe, Lufkin Vernier Calipers; S No. 200 for 10"-12" Height Gages, also 10"-18"-24" Vernier Calipers; S No. 300 for most popular type 18" and 24" Height Gages and for 36"-48" 60" and 72" Calipers.

For Complete Information Write, Phone or Wire

STEAR COMPANY

219 28th Ave. North

Minneapolis 11, Minn.

Circle No. 530 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

INDEX TO PRODUCTS IN THIS ISSUE

MACHINE AND TOOL

blue book

A

Abrasive Cloth, Paper, Discs, Wheels, Stones,
Belts, etc. 48
Abrasive Wheels, 58, 271
Air & Hydraulic Equipment, 15
Air Tools, 255
Alloys, 108
Angle Dressers, 218
Angle Irons, 178
Angle Plates, 178, 312
Anti-Friction Compounds, 299
Asbestos, 58

B

Backrests, roller, 69
Balancing Machines, 38, 39
Bar Machine, Automatic, 237
Bars, 108
Bearings, 60
Bearings, ball, 60
Bearings, roller, 60
Bearings, thrust, 60
Bench Blocks, 178
Benches, work, 178
Bending Equipment, 42, 291, 296, 322
Blades cut-off, 27, 28
Blades, back saw, 267
Blades, rotary shear, 221
Blocks, step, 288
Blocks, "V", 301
Bolts, 324
Bolts, latch, 256
Boring Bars and Tools, 252
Boring Heads, 16, 17, 46, 216
Boring Machines, 98, 165, 192D, 233
Boring Mills, 98, 162, 163, 229
Boring Spindles, 68
Boring Tools, 40
Box Angles, 178
Brass, drawing, 14
Brakes, press, bending, 46, 47
Broaches, 23, 326
Broaching Attachments, 148
Broaching Machines, 263
Broaching Service, 224
Bushings, 30, 199
Bushings, drill jig, 199, 322, 331
Bushings, guide pin, 30
Bushings, jig, fixture, 196, 258

C

Cam and Template Machines, 26
Cam Milling, 304

Cams, 217, 318, 336
Carbide Stock, 105
Carbide Tools, 29, 21, 43, 71, 105, 269
Center Taps, 269
Centers, live, 216, 224, 289, 291, 297, 314, 316
Chain Making Machines, 128D
Chamfering Tools, 62
Choppers, scrap, 332
Chucking Machines, 128A
Chucks, 51, 59, 130, 188, 223, 275
Chucks, Air-Operated, 15
Chucks, Automatic, 285
Chucks, Bearing, 51
Chucks, Collet, 51, 266
Chucks, Hand Operated, 130
Chucks, Hydraulic, 15
Chucks, Magnetic, 167
Chucks, Tapping, 51, 59
Circular Form Tools, 64
Clamps, 296
Clamps, Air, 296
Clamps, Oil, 296
Clamps, Strap, 256
Clamps, Toggle, 256, 293
Cleaners, 28
Clinchers, 75
Coil Cradles, 160, 181
Coil Grabs, 196
Coil Handler, 196
Coil Hooks, 196
Collet Closer, 218
Collets, 316
Comparators, Dial, 277
Comparators, Pocket, 182
Coolant Mist Generators, 184
Coolant Separators, 243
Coolants, 28
Counterbores, 97, 128
Countersinks, 97, 216, 221
Cut-off Blades, 27, 28
Cut-off Machines, 50, 187, 279
Cutters, 16, 17, 66, 67, 199, 216, 314, 322
Cutters, Arbor, 16, 17
Cutting Fluids, Oils, 133
Cylinders, Hydraulic, pneumatic, 15, 235

D

Dial Index Feed, 160
Dial Indicators, 306
Diamond Wheels, 268
Die Casting Machines, 86
Die Checker, 92, 314
Die Cushions, 204
Die Making Machines, 53

P
R
O
D
U
C
T
S

I
N
D
E
X

Die Sections, 203
Die Set Pullers, 332
Die Sets, 33, 45, 95, 290
Die Stock, 205
Dies, 22, 227, 257, 292
Dogs, Lathe and Milling Machine, 4
Draw Bars, 316
Dressers, Angle, 218
Dressers, Tool, 218
Drill Heads, 44, 214
Drill Point Thinners, 53
Drill Pointers, 53
Drilling Attachments, 199, 223
Drilling Machines, 56, 192D
Drilling Machines, Bench, 191
Drilling Machines, Multiple Spindle, 165
Drilling Machines, Radial, 37, 56, 90
 Inside Back Cover
Drilling Machines, Upright, 90, 132
Drilling & Reaming Machines, 165
Drilling & Tapping Machines, 132
Drilling Units, 1, 44
Drills, 43, 97, 221, 258, 255, 318
Drills, Carbide, 313, 337
Drills, High Speed, 318
Drills, Radial, 242
Drills, Twist, 20, 21
Dry Floor Compound, 252
Duplicating Attachments, 302
Dust Control, 281

E

End Mills, 201
Engravers, 57, 65

F

Facing Heads, 324
Facing Machines, 192D
Feed Fingers, 192A, 222
Feeders, Parts, 158, 244
Feeds, Slide, 128D
Files, 189, 195, 216, 252
Files, Rotary, 216
Files, Tube Burring, 216
Fixtures, 207, 326
Fixtures, Cutter Grinder, 207
Flanging Machines, 293
Flexible Shaft Equipment, 56
Flexible Shaft Machines, 56
Floor Cleaners, 252
Form Tools, Circular, 64
Furnaces, Heat-Treating, 89, 246, 261
Furnaces, Electric, 301, 327

G

Gages, 43, 49
Gages, Depth, 333
Gages, Dial, 82
Gages, Dial Snap, 82
Gages, Setting Discs, 231
Gages, Groove, 211
Gages, Height, 52

Gages, Internal, 317
Gages, Micrometer, 78
Gages, Optical, 52
Gages, Plug, 269, 331
Gages, Ring, 231, 331
Gages, Ratchet, 333
Gages, Snap, 82
Gaging Equipment, 231, 317
Gear Cutting Machines, 74, 75, 123
Gear Measuring Equipment, 74, 75
Gear Shift Drives, 77
Gear Testers, 74, 75
Gears, 217, 301
Gears, Helical, 289
Gears, Worm, 289
Grinders, 215, 232, 284
Grinders, Air, 238
Grinders, Abrasive Belt, 303
Grinders, Axial Relief, 215
Grinders, Belt, 252
Grinders, Bench, 88
Grinders, Carbide Tool, 3, 232, 259
Grinders, Centerless, 8, 9, 25
Grinders, Cylindrical, 8, 9, 25, 37, 259
Grinders, Disc, 88
Grinders, Drill, 53, 268
Grinders, Face Mill, 53
Grinders, Flat Circular, 259
Grinders, Floor, 88
Grinders, Hand, 238
Grinders, Internal, 259
Grinders, Jig, 227
Grinders, Micro-Centric, 8, 9,
Grinders, Oscillating Radius, 25
Grinders, Portable, Air, 238
Grinders, Radial Relief, 215
Grinders, Rotary, 83, 259
Grinders, Spline, 25
Grinders, Surface, 159, 169, 175, 192B
Grinders, Tap, 284
Grinders, Template Tool, 53
Grinders, Tool & Cutter, 53, 74, 241
Grinders, Wet or Dry, 252
Grinding Attachments, 207
Grinding Heads, 227
Grinding Spindles, 68, 199
Grinding Wheels, 149
Grooving Tools, 62
Guards, Press, 332
Guide Pins, 30

H

Hammers, High Speed, 224
Hammers, Lead, 322, 338
Hinges, 320
Hob Sharpeners, 68, 67
Hobbing Machines, 66, 67
Hobs, 66, 67
Holders, Back Rest, 69
Holders, Cut-Off Blade, 69
Holders, Dial Indicator, 299
Holders, Die, 69
Holders, Drill, Tap, Reamer, 69
Holders, Floating Drill, 69
Holders, Tap & Die, 69
Holders, Tool, 125
Holding Fixtures, 206
Honing Machines, 7, 197, 247



**First
In Quality
All Ways**

INFINITE precision in engineering, design and construction impart absolutely **FINEST QUALITY**. 54 years of constant advancement in skills and equipment enable you to profit by the extremely attractive cost of **CONWAY CLUTCHES**.

A wide variety of types and many sizes provide the correct answer to the innumerable demands in starting, stopping and running machinery. Every **CONWAY CLUTCH** is thoroughly dependable, thoroughly adapted to excellent performance on its particular duty.

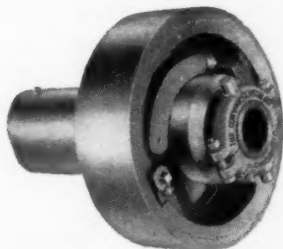
Every clutch offers: contained and balanced construction, easy engagement, large lever ratio, direct release, drag-free idling, simple adjustment, overload power capacity, large frictional areas and powerful leverage.

CONWAY CLUTCH

"The Clutch of

Robust Refinement"

**Standardized, interchangeable
parts precision-built of
basic materials.**



**WRITE FOR NEW BULLETINS
FOR EVERY TYPE OF INDUSTRY**

THE CONWAY CLUTCH CO.

1105 MARSHALL ST.

CINCINNATI 25, OHIO

I

Index Fixtures & Tools, 218, 240
Index Tables, 194, 217, 227
Industrial Wipers, 128-B-C
Insert Chasers, 220
Inspection & Measuring Devices, 207, 303
Inspection Units, 297

J

Jig Bore, 37, 227, 234, 304
Jig Boring, 318
Jig Feet, Double End & Screw Type, 254
Jigs & Fixtures, 298
Jointers, 59
Jump Edge Finder, 280

K

Keys, Fixture, 256
Keys, Woodruff, 303
Keyseaters, 234, 342
Knives, Circular, 221
Knobs, Hand, 296
Knobs, Machine, 256
Knurling Tools, 69, 315

L

Lamps, Floating, 212
Lapping Machines, 89, 147
Lathes, 31, 38, 39, 56, 61
 Inside Back Cover
Lathes, Automatic, 72, 73
Lathes, Bench, 183
Lathes, Engine, Toolroom, 72, 73, 183, 323
Lathes, Floor, 61, 208
Lathes, High Speed, Back Cover
Lathes, Heavy Duty, 162, 163, 173
Lathes, Hydraulic Tracer, 31
Lathes, Precision, 208, Back Cover
Lathes, "T", 72, 73
Lathes, Turret, 2, 38, 39, 179
Lathes, Vertical Turret, 67
Layout Fluid, 248, 295
Lighting Equipment, 200, 212
Live Centers, 216, 289, 291, 316
Lock Screws, 185
Lubricants, 18, 19, 63, 300
Lubricators, 143

M

Machine, Mounts, 81
Magnifying Lens, 342
Mandrels, expanding, 289
Marking Machines, 54, 280
Marking Tools, 54
Metallizing, 79
Micrometer Dial Indicators, 78
Micrometers, 266
Microscope, Toolmakers, 303
Milling Cutters, 28, 283

Milling Heads, 36
Milling Machine Spindles, 68
Milling Machines, 32, 37, 57, 225, 278
Milling Machines, Angular, 25
Milling Machines, Bench, 183
Milling Machines, Hand, 70
Milling Machines, Horizontal, 25, 162, 163
Milling Machines, Ram Type, 25
Milling Machines Vertical, 10, 25, 32, 162, 163, 311, 333
Mills, 16, 17, 20, 21, 155, 241, 269
Mills, Shell End, 28
Mills, Side, 16, 17
Mills, Slab, 16, 17
Motors, Shaftless, 80
Mounting Pads, 81

N

Nutrunners, 255
Nuts, 256
Nuts, Flanged, 256
Nuts, Tee, 256

O

Oil Groovers, 135
Optical Equipment, 342

P

Pans, 332
Pantographs, 37, 65, 241
Paper Products, 128-B-C
Parallels, 197
Pipe, Heated, 282
Plates, 178
Plates, Angle, 297
Plates, Bench, 178
Plates, Layout, 297
Plates, Surface, 178, 297, 325
Plates, T-Slotted, 297
Plates, Lapping, 178
Press Brakes, 204, 226
Press Room Equipment, 272
Presses, Arbor, 272
Presses, Bench, 250
Presses, Deep-Throat, 134
Presses, Double Crank, 85, 134, 204
Presses, Foot, 332
Presses, Horn, 134
Presses, Hydraulic, 204, 249, 250
Presses, Mechanical, 204
Presses, O.B.L., 85, 134, 245
Presses, Power, 46, 47, 226, 245, 249
Presses, Punch, 160, 190, 249, 335, 339
Presses, Ram, 160
Presses, Straightside, 85
Presses, Transmat, 204
Presses, Turret Punch, 76
Pumps, Coolant & Lubricant, 309
Punches, 213, 292, 322
Punching Equipment, 41
Pushers, 192A

R

Racks, 289
Ratchets, 289
Reamers, 20, 21, 43, 63, 67, 97, 221, 269, 311
Recessing Tools, 62, 69, 125
Reels, Stock, 128D, 181, 332
Riveters, 284, 311
Riveting Machines, 224
Roll Feeds, 24, 160, 181, 332
Rollers, 251
Rotary Tables, 227

S

Sanders, Belt, 285
Saw Blades, Band, 272, Inside Front Cover
Saw Blades, Hack, 60, Inside Front Cover
Saw Sharpeners, 272
Sawing Machines, 24, 219
Sawing Machines, Arbor, 56
Sawing Machines, Band, 56, 57, 186, 192C, 307
Sawing Machines, Circular, 24
Sawing Machines, Cut-Off, 56, 219
Sawing Machines, Jig, 56
Sawing Machines, Radial, 56
Saws, Carbide-Tipped, 221
Saws, Metal-Cutting, 28, 221, 252
Scrap Cutters, 290
Screw Drivers, Power, 255
Screw Driving Machines, 158
Screw Machines, Automatic, 86, 128A, 166, 167, 241
Screws, 185, 256, 289
Screw Sets, Transfer, 336
Screws, Cap, Set, Socket & Machine, 150, 151
Services: Boring, Grinding, Lapping, Milling, Repairing, etc., 326, 341
Shapers, 304
Shearing Machines, 35, 47, 280
Shears, Bench, 144
Shears, Hand, 342
Shears, Lever, 342
Shears, Punch, Coper, 299
Slide Abrader, 192
Slide Feeds, 128D
Slide Guide, 171
Slotters, 162, 163
Special Machinery, 192D
Speed Reducers, 223, 301
Spindle Shapers, 56
Spindles, 68
Spindles, High Speed, 68
Spring Collars, 265
Sprockets, 228
Stampings, 210
Staple Making Machines, 128D
Steel Blue, 295
Steel and Steel Stock, 29, 55, 108
Stock Oilers, 332
Stop Stock, revolving, 69
Stock Forming Machines, 128D
Stock Straighteners, 294
Straight Edges, 178, 328
Straighteners, 160, 181, 332
Stud Setters, 59
Studs, Cut Threads, 256

Surface Plates, 178
Surfacers, Belt & Disc, 56
Switches, Limit, 329

T

Tables, Checking, 178
Tables, Elevating, Adjustable, 119, 323
Tables, Reading, 178
Tap Chucks, 59
Tap Extractors, 274
Tap Guides, 312
Tap Holders, 69
Tappers, 264
Tappers, Automatic Reverse, 214
Tappers, Hand, 312
Tapping Attachments, 59
Tapping Heads, 44
Tapping Machines, 59, 121, 192D, 193, 315
Tapping Units, 44
Taps, 11, 43, 92, 287
Test Indicators, 198
Thread Gages, 333
Thread Rolling Machines, 22, 251
Thread Taps, 11
Threaders, Hand, 312
Threading Machines, 92, 257
Tool Control Boards, 49
Tool Heads, 306
Tool Holders, 2, 4, 230, 274, 315
Tool Posts, 69
Tool Posts, Turret, 315, 329
Tool Posts, Universal, 69
Tools, Dies, 270
Tools, Porting, 270
Tote Pans, 334
Transfer Machines, 227
Trunnion, 278
Tubing, 108
Turning Tools, 69
Turntables, 216
Turrets, 330
Turrets, Drill, 12
Turrets, Lathe, 330
Turrets, Toolpost, 330

V

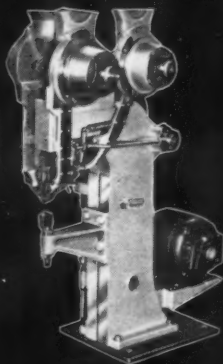
V-Blocks, 131, 178, 312
Valves, 13
Valves, Air, 13, 15, 181
Valves, Hydraulic, 15
Vises, Bench & Machine, 265, 292, 319, 321, 334

W

Washers, Spherical, 256
Welding Equipment & Supplies, 239
Wipers, Industrial, 128-B-C
Wipers, Way, 310
Wire Straightening Machines, 128D
Woodruff Cutters, 314
Woodruff Keys, 303
Winches, Automatic, 305

AT *Chicago Rivet* ALL 3

will reduce your
Fastening Costs



Chicago Rivet & MACHINE CO.

9610 West Jackson Boulevard,
Bellwood (Chicago Suburb) Illinois
Branch Factory: Tyrone Pa.

New Rivet Catalog
contains engineering
data, list of popular
semi-tubular, full
tubular, split and
shoulder rivets and
popular automatic rivet
setters. Write for copy.



rivets

**Semi-Tubular,
Split and Shoulder**



You avoid machine down-time because every semi-tubular, full tubular, split, shoulder or special rivet is precision made and hand inspected to assure free, non-clogging movement in automatic setters.

rivet setters

Your fastening costs are less because Chicago Rivet makes machines that set from one to seven rivets at a time. Riveting is automatic and may involve the use of special indexing fixtures, adjustable riveting centers, and top or bottom rivet feeding and other mechanisms, controlled by solenoids or air cylinders or both.

engineering

The recommendations of Chicago Rivet Engineers are most valuable. Their knowledge of rivet fastening techniques, gained from solving thousands of manufacturers' fastening problems can help make your product more competitive. Calling Chicago Rivet is a habit-formed procedure with many companies. You incur no obligation when you use the service of Chicago Rivet Engineers. Send a blue print or sample assembly with your inquiry.

Circle No. 528 on Card, Opposite Page 65

INDEX TO ADVERTISERS

MACHINE AND TOOL

blue book

A

Aaron Machinery Company	37-57
Abart Gear and Machine Company	301
Abrasive Products, Inc.	48
Ace Drill Corporation	337
Acme Danneman Company, Inc. (Danneman Die Set Division)	290
Acme Tool Co.	301
Acromark Company	280
Aetna Manufacturing Company	184
Aget Manufacturing Company	281
Allegheny Ludlum Steel Corporation	55
Allen Collet Manufacturing Company	352
Allen Company, A. K.	194
Allied Products Corporation	203
Aloris Tool Company	315
American Brass Company	14
American Broach & Machine Company	263
American Chain & Cable Company	187
(Campbell Machine Division)	
American Machine & Foundry Company	285
(American Machine & Foundry Tool Div.)	
American Saw Manufacturing Co.	192-C
American Tool Works Co. Inside Back Cover	
Ames Company, B. C.	78
Amidon Engineering Company	342
Amitool Company	234
Apex Tool & Cutter Company	230
Armstrong-Blum Mfg. Co. Inside Front Cover	
Armstrong Brothers Tool Company	4
Arter Grinding Machine Company	259
Atlas Press Company	31
Atrax Company	71
Auto Moulding and Manufacturing Co.	320

B

B & E Manufacturing Co.	303
Baker Brothers, Inc.	165
Baldor Electric Company	232
Barber-Colman	66-67
Barnes Drill Company	243
Bathey Manufacturing Company	332
Beaver Gear Works, Inc.	289
Beaver Rotary File Company	216
Bellows Company	1
Benchmaster Manufacturing Company	160
Benco Collet Manufacturing Company	192-A
Besly-Welles Corporation	43
Beverly Shear Manufacturing Co.	280
Blanchard Machine Company	83
Blue Valley Machine & Manufacturing Company	293
Boggis & Company, Henry P.	284
Bokum Tool Company	62
Borel & Duner	306
Boston Gear Works	228
Boyar-Schultz Corporation	324
Bradley Machinery Company	311
Bremil Manufacturing Company	342
Brightboy Industrial Division	271
(Weldon Roberts Rubber Company)	

Bryant Gage & Spindle Division	211
(Bryant Chucking Grinder Co.)	
Buck Tool Company	275
Buckeye Tools Corporation	255
Buffalo Forge Company	249
Bullard Company	167
Burg Tool Manufacturing Company	12
Busch Company, J. C.	328

C

Carroll-Jamieson Machine Tool Co.	323
Challenge Machinery Company	178
Chandler Tool Company	306
Chicago Latrobe	97
Chicago Mfg. & Distributing Company	300
Chicago Rawhide Manufacturing Co.	310
Chicago Rivet & Machine Company	348
Chicago Wheel & Manufacturing Company	192
Cincinnati-Bickford Div.	90
(Giddings & Lewis Machine Tool Company)	
Cincinnati Grinders, Inc.	8-9
Cincinnati Milling Machine Company	133-149
(Products Division)	
Cincinnati Shaper Company	34-35
Circular Tool Company	221
Clarke Specialty Company	268
Clemson Brothers, Inc.	267
Cleveland Automatic Machine Company	86
Clipper Diamond Tool Company	268
Collins Microflat Company	237
Columbus Die-Tool & Machine Co.	270
Commander Manufacturing Company	264
Comtor Co.	317
Conant Broach Company	326
Conical Tool Company	253
Connors & Davis Sales Corporation	265
Consolidated Machine Tool Div.	162-163
(Farrel-Birmingham Co.)	
Continental Tool Works Div.	23
(Ex-Cell-O Corp.)	
Conway Clutch Company	345
Cook & Chick Company	158
Cook Incorporated, Lawrence H.	322
Cooley Electric Mfg. Corp.	261
Coulter Machine Company, James	257
Crane Packing Company	147
Criterion Machine Works	40
Crucible Steel Company of America	29
Cutting Tools, Inc.	341

D

Danly Machine Specialties, Inc.	45
Danneman Die Set Division	290
(Acme Danneman Company)	
Davis Boring Tool Division	229
(Giddings & Lewis Machine Tool Company)	
Davis Keyseater Co.	234
Dayton Rogers Manufacturing Company	210

Dazor Manufacturing Corporation	212
Dearborn Gage Company	231
Denison Engrg. Div.	250
Denison Manufacturing Company, R. B.	329
Derbyshire, Inc., F. W.	183
Detroit Die Set Corporation	95
DeVlieg Machine Company	98
Dillon and Company, Inc., W. C.	198
Diaton Division, Henry	260
(H. K. Porter Company, Inc. of Pittsburgh)	
Dixon Automatic Tool Company	196
Donovan Manufacturing Company	319
Dreis & Krump Manufacturing Company	291
duMont Corporation	148
Durant Tool Supply Co.	272-332
Dykem Company	295

E

Eastern Machine Screw Corporation	220-341
Eclipse Counterbore Company	128
Economy Tool & Machine Company	331
Eisler Engineering Company, Inc.	217
Electro-Matic Products Company	107
Empire Tool Company	27
Enco Manufacturing Company	330
Etico Tool Company	44
Ex-Cell-O Corporation	199

F

Fairfield Development Laboratories, Inc.	182
Falls Products, Inc.	297
Fellows Gear Shaper Company	74-75
Felters Company	81
Fen Machine Company	305
Ferracute Machine Company	226
Fischer Machine Company	135
Flynn Manufacturing Company	216
Fostoria Pressed Steel Corporation	200
Fulmer Company, C. Allen	7

G

Gallmeyer & Livingston Company	175
George Machinery Company, James W.	132-272
Giddings & Lewis Machine Tool Company	229
(Davis Boring Tool Division)	
Gisholt Machine Company	39-39
Gorton Machine Company, George	241
Grant Manufacturing & Machine Co.	311
Greaves Machine Tool Co.	171
Green Instrument Company	65
Green Manufacturing Company	222
Greenerd Arbor Press Company	272
Greenlee Brothers & Company	237
Grob, Inc.	252

H

Hall Manufacturing Company	266
Hallock Company, F.	224
Hamilton Tool Company	119-121-123
Hammond Machinery Builders	3
Hardinge Brothers, Inc.	Back Cover
Harg Manufacturing Corporation	207
Hartford Special Machinery Company	251
Heinrich Tools, Inc.	298
Heller Tool Company	195
Hendley and Whittemore Company	299
Herman Stone Company	325
High Speed Hammer Company	224
Himoff Machine Company	304
Horton Chuck Division	188
(Greenfield Tap & Die Corporation)	

Houston Grinding & Manufacturing Company	291
Huppert Company, K. H.	327

I

Index Machine Company	32
Ingersoll Milling Machine Company	16-17

J

Jaco Devices, Inc.	290
Jacobs Mfg. Company	51
Jersey Manufacturing Company	304
Johnson & Bassett, Inc.	278
Johnson Gas Appliance Company	89
Johnson Machine & Press Corporation	85
Johnson Manufacturing Corporation	307

K

Kalina & Company, J. M.	302
Kasson Die and Motor Corp.	316
Kaufman Manufacturing Company	193
Kenco Manufacturing Company	190
Kent-Owens Machine Company	225
Keo Cutters	311
Kidde Precision Tool Corporation	304-336
Kilham Engineering, Inc.	296
Kitzman Manufacturing Company	336
Koenig, William A.	333
Kuma Tool Company	218

L

L & L Manufacturing Company	301
Lamina Dies & Tools, Inc.	30
Landis Machine Company	92
LaPeer Manufacturing Company	206
Lassy Tool Company	312-315
Levin & Son, Inc., Louis	179
Lewthwaite Machine Company, T. H.	292
Lima Electric Motor Company	77
Lincoln Electric Company	239
Linley Brothers Company	284
Littell Machine Company, F. J.	181
Logan Engineering Company	61
Logansport Machine Company	15
Lubikold Company	299
Lucas & Son, Inc., J. L.	334
Lucifer Furnaces, Inc.	246
Lund Manufacturing Company	341

M

Machine Tool Publication	341
Madison-Kipp Corporation	238
Manhattan Rubber Division	58
(Raybestos-Manhattan Inc.)	
Manhattan Supply Company	329
Martin Machine Company, J. E.	292
Maserati Corporation of America	333
Masters Precision Tools	341
Maxwell Manufacturing Company	254
Melin Tool Company	155
Metallizing Engineering Company	79
Meyers Company, Inc., W. F.	258
Michigan Chrome & Chemical Company	248
Midwest Tool & Engineering Company	323
Minster Machine Company	339
Modern Machine Tool Company	50
Monarch Machine Tool Company	72-73
Montgomery Tools	333
Morse Twist Drill & Machine Company	20-21
Motch & Merryweather Machinery Co.	28
Mummert-Dixon Company	324

N

National Acme Company	176-177
National Automatic Tool Company	192-D
Neill & Company, Ltd., James	299
New Britain Tool & Machine Company	334
New Method Steel Stamps, Inc.	273
Niagara Machine & Tool Works	46-47
Nichols-Morris Corporation	70
Nicholson File Company	189
Nielsen, Incorporated	289
Nielsen Tool & Die Company	336
Nilson Machine Company, A. H.	128-D
Noble & Westbrook Manufacturing Company	54
Norgren Company, C. A.	143
Norma-Hoffman Bearings Corporation ..	60
Northwestern Tool & Engineering Company	256
Norton Company	159

O

Oerlikon Machine Tool Works	233
Oliver Instrument Company	53
Oliver Machinery Company	252
O'Neil-Irwin Manufacturing Company ..	144

P

Patton Manufacturing Company, Inc.	289
Pedrick Tool & Machine Company	42
Penniman, Elisha	280
Pivot Punch & Die Corporation	213
Plunket Machine Company, J. E.	321
Pope Machinery Corporation	68
Porter Co., Inc., of Pittsburgh, H. K. ..	260
(Henry Diston Division)	
Pratt & Whitney Company	26-277
Prebco Bushing Company	322
Precision Tool & Manufacturing of Ill. ..	131
Procurier Safety Chuck Company	59
Pruett Corporation	22
Putnam Tool Company	201

Q

Quality Tool Works	314
Queen City Machine Tool Company	88

R

R and L Tools, Inc.	69
Racine Hydraulics & Machinery, Inc.	219
Raybestos Manhattan Inc.	58
(Manhattan Rubber Div.)	
Reading Machine Company	342
Reid Brothers' Company, Incorporated ..	192-B
Reid Company, William	342
Richards Company, J. A.	322
Ring Punch & Die Co.	340
Rockwell Mfg. Company	56
(Walker-Turner Division)	
Rockwin Manufacturing Company	315
Roll Feeds Corporation	84
Ross Operating Valve Company	13
Royal Oak Tool & Machine Company	215
Royal Products	224
Rusnok Tool Works	36
Ruthman Machinery Company	309
Ryerson and Son, Incorporated, Joseph T. ..	108

S

Sales Service Machine Tool Company	245
Sanford Manufacturing Corporation	169
Scherr Company, Inc., George	303
Schmitt Company, R. L.	269

Scott Paper Company	128B-C
Scully-Jones & Company	125
Seibert & Sons, Inc.	49
Service Machine Company	134
Sheldon Machine Company	208
Shell Oil Company	63
Sid Tool Company	283
Sidney Machine Tool Company	173
Sigourney Tool Company	191
Simonds Saw & Steel Company	205
Slocumb Micrometer Company	266
Somma Tool Company	64
Sossner Tap & Tool Corp.	11
Sperman Metal Specialties	294
Standard Die Set Mfrs. Inc.	33
Standard Gage Company	82
Standard Pressed Steel Company	150-151
Standard Steel Specialties, Inc.	303
Sta-Warm Electric Company	282
Stebur Company	342
Stone Machinery Company	279
Strong, Carlisle & Hammond Company	185
Sturdimatic Tool Company	216
Sun Oil Company	18-19
Sundstrand Machine Tool Company	240
Sunnen Products Company	197
Super Tool Company	313
Supreme Products Corporation	223
Syntron Company	244

T

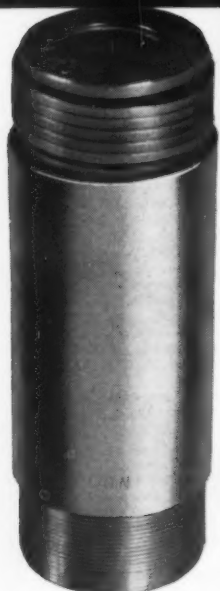
Tamms Industries, Incorporated	252
Taylor Associates	341
Thomas Hoist Company	130
Thriftmaster Products Corporation	214
Tietzmann Tool Corporation	288-296-314
Tomkins-Johnson Company	235
Transmats Corporation	132
Tree Tool and Die Works	10
Ty-Sa-Man Machine Company	24

V

Van Norman Machine Tool Company	25
Vapor Blast Manufacturing Company	247
Vascoloy-Ramet Corporation	105
Veet Industries, Inc.	242
Verson All Steel Press Company	204
Victor Machinery Exchange, Inc.	318
Vogel Tool & Die Corporation	335
Vulcan Tool Company	227

W

Wade Tool Company	2
Wales-Strippit Corporation	41
Walker-Turner Division	56
(Rockwell Mfg. Company)	
Walls Sales Corporation	285
Walton Company	274
Ward Thread Grinding Company	326
Wardwell Manufacturing Company	284
Warner & Swasey Company	128-A
Watts Brothers Tool Works	288
Webber Gage Company	52
Weldon Roberts Rubber Company	271
(Brightboy Industrial Division)	
Wells Manufacturing Corporation	186
Western Tool Supply Company	287
West Point Manufacturing Company	293
Wetmore Tool & Engineering Company	270
Wiedemann Machine Company	76
Wood-Compton Company	342
Woods Machine Company, S. A.	80



It's New! It's Different!

the Burns Style

TAPER LOCK PUSHER

(NOW Featured by Allen)

No Friction

No Scratch

No Wear



Pat.
Pending

**GET
DETAILS
NOW**

Many other important features

Burns style Taper Pushers wear in and do not wear out. The taper lock principle enables the gripping surface to expand and contract automatically within a different range which fits both hot rolled stock and cold finished stock without change of pusher. . . . The pusher locks positively in forward direction and opens freely in opposite direction . . . No friction or scratch on return of pusher. Bar cannot bounce back from the stock stop. Eliminates short pieces that waste material and machine time . . . Taper lock holds regardless of length . . . Bars up to 20 feet and longer used with ease and without strain . . . The automatic adjustment of the taper lock increases the pusher life many times over that of the ordinary pusher.

**will pay for themselves in 3-weeks time
through tangible savings of money**

Desirable territories open for representation, inquire now

ALLEN COLLET MFG. CO., INC.

17720 CLARANN AVE. • MELVINDALE, MICHIGAN

Circle No. 529 on Card, Opposite Page 65

October, 1956 For free information . . . use these postage-free Action Cards

Free Literature circle key numbers

1	11	21	31	41	51	61	71
2	12	22	32	42	52	62	72
3	13	23	33	43	53	63	73
4	14	24	34	44	54	64	74
5	15	25	35	45	55	65	75
6	16	26	36	46	56	66	76
7	17	27	37	47	57	67	77
8	18	28	38	48	58	68	78
9	19	29	39	49	59	69	79
10	20	30	40	50	60	70	80

New Products circle key numbers

81	91	101	111	121	131	141	151	161	171
82	92	102	112	122	132	142	152	162	172
83	93	103	113	123	133	143	153	163	173
84	94	104	114	124	134	144	154	164	174
85	95	105	115	125	135	145	155	165	175
86	96	106	116	126	136	146	156	166	176
87	97	107	117	127	137	147	157	167	177
88	98	108	118	128	138	148	158	168	178
89	99	109	119	129	139	149	159	169	179
90	100	110	120	130	140	150	160	170	180

Company.....

Name..... Position.....

Street.....

City..... Zone..... State.....

October, 1956 For free information . . . use these postage-free Action Cards

Advertisements

circle key numbers

201	226	251	276	301	326	351	376	401	426	451	476	501	526	551	576
202	227	252	277	302	327	352	377	402	427	452	477	502	527	552	577
203	228	253	278	303	328	353	378	403	428	453	478	503	528	553	578
204	229	254	279	304	329	354	379	404	429	454	479	504	529	554	579
205	230	255	280	305	330	355	380	405	430	455	480	505	530	555	580
206	231	256	281	306	331	356	381	406	431	456	481	506	531	556	581
207	232	257	282	307	332	357	382	407	432	457	482	507	532	557	582
208	233	258	283	308	333	358	383	408	433	458	483	508	533	558	583
209	234	259	284	309	334	359	384	409	434	459	484	509	534	559	584
210	235	260	285	310	335	360	385	410	435	460	485	510	535	560	585
211	236	261	286	311	336	361	386	411	436	461	486	511	536	561	586
212	237	262	287	312	337	362	387	412	437	462	487	512	537	562	587
213	238	263	288	313	338	363	388	413	438	463	488	513	538	563	588
214	239	264	289	314	339	364	389	414	439	464	489	514	539	564	589
215	240	265	290	315	340	365	390	415	440	465	490	515	540	565	590
216	241	266	291	316	341	366	391	416	441	466	491	516	541	566	591
217	242	267	292	317	342	367	392	417	442	467	492	517	542	567	592
218	243	268	293	318	343	368	393	418	443	468	493	518	543	568	593
219	244	269	294	319	344	369	394	419	444	469	494	519	544	569	594
220	245	270	295	320	345	370	395	420	445	470	495	520	545	570	595
221	246	271	296	321	346	371	396	421	446	471	496	521	546	571	596
222	247	272	297	322	347	372	397	422	447	472	497	522	547	572	597
223	248	273	298	323	348	373	398	423	448	473	498	523	548	573	598
224	249	274	299	324	349	374	399	424	449	474	499	524	549	574	599
225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600

INSIDE: 1A 1B 1C 1D 2A 2B 2C 2D 3A 3B 3C 3D

Company.....

Name..... Position.....

Street.....

City..... Zone..... State.....

FIRST CLASS
PERMIT NO. 272

WHEATON, ILLINOIS

BUSINESS REPLY CARD

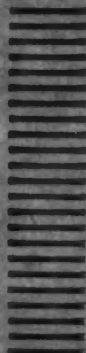
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3c POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS



FIRST CLASS
PERMIT NO. 272

WHEATON, ILLINOIS

BUSINESS REPLY CARD

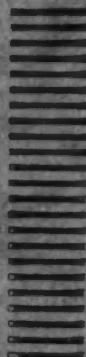
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3c POSTAGE WILL BE PAID BY

MACHINE and TOOL BLUE BOOK

READERS' SERVICE DIVISION

WHEATON, ILLINOIS



THEY WOULDN'T BELIEVE IT

*-until they
SAW it!*

Seeing was believing for a group of mechanical officials from one of the mid-west's most prominent earth moving equipment builders.

Frankly they just wouldn't believe that the new 32" "AMERICAN" Pacemaker Lathe would effectively use 60 horse power and cemented carbide cutting tools in machining rough alloy steel forgings. So they came to see for themselves and they saw:

- 1** Cuts $1\frac{1}{8}$ " deep
- 2** Cutting speed 300 feet per minute.

3 .030" feed.

4 60 to 65 horse power registered by horse power meter during the maximum cuts.

5 Not a shimmy or whimper from the machine.

*They were amazed
and convinced.*

This new model Pacemaker is endowed with the power, stamina and convenience that combine to produce a thoroughly dependable and highly productive unit.

Bulletin
No. 44
tells all ...
have one?

THE AMERICAN TOOL WORKS CO.

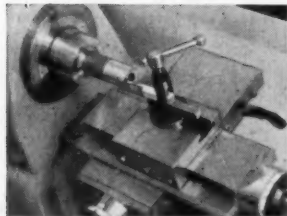
Cincinnati 2, Ohio, U. S. A.

LATHES AND RADIAL DRILLS

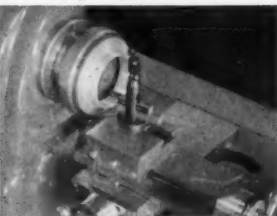
HARDINGE
ELMIRA, N.Y.

HIGH SPEED PRECISION LATHE

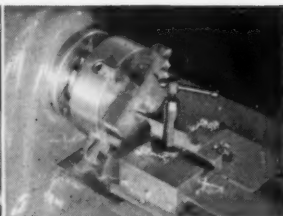
Correct Size - High Speed - Precision Results



Collet Work — The right machine for collet work of 1-1/16" or less diameter.



Step Chuck Work — For rapid and accurate holding of tubing, castings, moldings, stampings and machined parts. Capacity to 6".



Jaw Chuck Work—Integral mount, universal or independent, for extra accuracy. Capacity to 5".



HARDINGE

DOVETAIL BED

HARDENED
AND
GROUND STEEL

The above three important requirements for proper lathe work in tool rooms, production departments, or laboratories are completely fulfilled by the new Hardinge DV59 High Speed Precision Lathe.

Correct size of the machine in relation to work saves loss from under-capacity production on larger lathes. High spindle speeds, up to 3500 r.p.m., permit full capacity cutting and excellent finish. Sustained accuracy and ease of operation assure precision results.

SPECIFICATIONS:
1 1/8" Collet Capacity
9" Swing
17" Center Distance
Infinitely Variable Speed
230—3500 r.p.m.

Send for Free illustrated Bulletin DV 59



HARDINGE BROTHERS, INC., ELMIRA, N. Y.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"